Chapter 2. Alternatives, Including the Proposed Action

2.1 INTRODUCTION

This chapter describes the applicant=s proposal, including the location, capacity, right-of-way (ROW) needs, safety features, construction methods, mitigation measures, and costs for the project. Alternatives to the proposal and alternative project components such as options for approaching and crossing the Columbia River are also discussed. For planning and common reference purposes, a 30-year operating period is assumed. The actual operating life of the Cross Cascade pipeline would be indefinite.

Both the Washington State Environmental Policy Act (SEPA) and National Environmental Policy Act (NEPA) guidelines require that alternatives meeting the need for the proposal be considered. They also require that the impacts of these alternatives be compared with the impacts of not implementing the alternatives (No Action). As this chapter explains, several alternatives to the proposal have been evaluated such as other modes of petroleum product transport, demand management, and other pipeline routes. These alternatives have been evaluated and eliminated from further study based on a series of criteria and the Purpose and Need statement (see the section titled AAlternatives Considered but Eliminated from Detailed Study@ later in this chapter). Therefore, this EIS evaluates the potential impacts of the proposed Cross Cascade pipeline as described in this chapter, and the No Action Alternative. No Action describes what would happen without the project, including what would happen to the Yellowstone and Chevron pipelines.

For an overview of the project features, see the Summary of this EIS. See the map supplement for maps of the segment numbers and mileposts used throughout this EIS in describing the pipeline corridor. OPL=s Application for Site Certification (ASC), as amended in May 1998, is referenced where appropriate in this and other chapters of this EIS.

2.2 OVERVIEW OF EXISTING SETTING AND ACTION

If approved and permitted, the proposed 370 km (230-mile) pipeline[1] would originate on

OPL=s existing north-south lines just north of the King-Snohomish county line near Woodinville (Figure 2-1). The pipeline would extend to the east, crossing Snoqualmie Pass into Kittitas County generally following the same mountain passes as Interstate 90 (I-90). A storage and transfer terminal would be built at the town of Kittitas, adjacent to I-90. The line would cross the Columbia River downstream of Wanapum Dam in Grant County, before turning south to terminate at the Northwest Terminalling Company's existing terminal in Pasco, Washington.

2.2.1 Pipeline Capacity

The pipeline would have an initial delivery operating capacity of 60,000 bbls (2,520,000 gallons) per day with the three proposed pump stations, and an ultimate capacity over time of up to 110,000 bbls (4,620,000 gallons) per day with all six pump stations built and operating. The additional three stations would only be constructed if demand continued to increase. The overall delivery capacity of the pipeline is focused on and limited to projected demand, not developing new markets or export. For example, assuming an initial demand of 60,000 bbls per day and a 1.5 percent compounded growth rate for a 30-year planning period, the pipeline would reach 94,000 bbls or 85 percent of its maximum capacity in 30 years and would be able to continue at that rate of growth for less than 50 years total. That same rate over a 50-year period would yield 126,000 bbls, which is in excess of the capacity of the line. (The existing north-south line is 35 years old and has reached capacity.)

If the rate of compounded growth were 2 percent, transport demand would reach pipeline capacity within the first 30 years, when 109,000 bbls per day would be required. In either scenario, the project is responding to existing and currently projected shipping demand in Washington.

2.2.2 Right-of-Way Requirements

Approximately 176.2 km (109 miles) or 47 percent of the pipeline corridor would be located within existing cleared ROW (Table 2-1). About 90.1 km (56 miles) or 24 percent would be located immediately adjacent to existing cleared corridors. These areas are primarily roadways where existing utilities or roadway construction precluded placing the pipeline within the existing ROW. About 106.2 km (66 miles) or 29 percent would be located in new corridors.

Of the 370 km (230 miles) of pipeline, approximately 40.3 km (25 miles) of pipeline ROW are owned by federal agencies, 48.3 km (30 miles) of ROW are owned by state agencies, and King County owns approximately 3.2 km (2 miles) (Table 2-2). The majority of federal ownership along the proposed route is within lands managed by the U.S. Forest Service and the Bureau of Reclamation. The remaining 280.1 km (174 miles) of ROW are privately owned. The proposed pipeline would utilize two trail systems, the Cedar Falls Trail managed by King County and the John Wayne Trail owned by Washington State Parks.

Table 2-1. Summary of Right-of-Way Requirements by County, Proposed Pipeline Project (miles)

County	New Corridor	Adjacent to Existing Corridor	Inside Existing Corridor	Total Mileage
Snohomish	2.0	0.0	12.0	14.0
King	3.5	3.5	36.5	43.5
Kittitas	39.0	6.5	47.0	92.5
Grant	9.0	21.5	0.0	30.5
Adams	1.5	6.4	1.5	9.4
Franklin	11.0	18.0	12.1	41.1
Total	66.0	55.9	109.1	231.0

Source: OPL 1998.

Table 2-2. Summary of Right-of-Way Ownerships

Ownership	Miles*	Percentage
Federal Agencies:		
U.S. Forest Service	11.34	4.9
Bureau of Land Management	0.54	0.2
Bureau of Reclamation	12.42	5.4
U.S. Fish & Wildlife Service Columbia National Wildlife Refuge	0.45	0.2
Total Federal Ownership	24.75	10.7
State Agencies:		
Natural Resources	7.55	3.3
Parks & Recreation	19.76	8.6
Department of Fish and Wildlife	0.22	0.1
Total State Ownership	29.73	12.9
Local Agencies:		
King County Roads	1.51	0.7
Private Ownership:		
Private Owners	175.04	75.9
Total Miles	230.70	100

Source: OPL 1998.

* Numbers are approximate and not the result of boundary survey.

2.3 PROPOSED ACTION: PETROLEUM PRODUCT PIPELINE

2.3.1 Ability to Meet the Purpose and Need

The proposal=s ability to meet the Purpose and Need described in Chapter 1 is discussed below.

Cost-Effectiveness: The new pipeline would transport petroleum products from refineries in Anacortes (Marche Point) and Whatcom County (near Cherry Point) to central and eastern Washington at a lower cost than the existing trucking and barging system, an estimated $1.50 per barrel (OPL 1998) to Pasco. This is in response to shippers= request for a system costing less than truck or barge. Alternatives that cost more than the existing systems would not be used by shippers and are therefore not cost-effective. Various alternative routes and alternative crossings offer a range of cost-effectiveness at lower cost than existing trucking and barging.

Efficiency: The proposal would be more efficient than the existing system because it involves fewer transfers and is more reliable. It would avoid the need to offload product from one transport mode to another, such as the existing pipeline onto tanker trucks for shipment across the Cascades. Construction of a new pipeline would eliminate tanker truck transport across Snoqualmie and Stevens Passes and establish a system to pick up petroleum product in Kittitas, rather than trucking it from Seattle across the passes. More significantly, it would avoid transfers from pipeline to Portland terminals to river barge to Pasco terminals, or from ocean barges to Portland onto river barges, or from Puget Sound barges to Harbor Island. Conversion and transfer from one mode of shipment to another is not as efficient as a single transport mode (i.e., the new pipeline). Winter time trucking across Snoqualmie and Stevens Passes can be delayed from many hours to days. The proposal would eliminate these inefficient delays. Pipelines are also a more efficient transport system in energy per ton mile than trucking or than shipping with multiple transfers.

Environmental Soundness: The proposal would reduce the risk of accidental spills during the transfer from one mode of shipment to another by reducing such transfers. The proposal would reduce the risk of spills from barges on the Columbia River and Puget Sound and tanker trucks along the I-90 corridor. It would provide a new pipeline system with spill detection. (Spill risk is discussed in detail in Section 3.18, Health and Safety, and Appendix A.) The proposal would create a risk of spill along the new pipeline corridor which does not now exist and would require 370 km (230 miles) of ROW, 29 percent of which is new and not adjacent to existing ROW. This new pipeline risk can be compared to the risk of barge, ship, and tanker truck spill and accidents which would continue to increase over time with increasing numbers of trips if the pipeline is not constructed. Spills and accidents are predicted in this EIS with and without the project.

- **Meeting Long-Range Needs:** The proposal would be sized to handle all of today=s product needs anticipated from western Washington refineries and future needs for at least 30 years at a 1.5 percent annual growth rate.

2.3.2 Description of Corridor Location and Project Features

This section provides an overview of the location and characteristics of the pipeline corridor, pump stations, Kittitas Terminal, and the terminus for the proposed pipeline. Additional details are provided in OPL=s amended ASC submitted to the Washington Energy Facility Site Evaluation Council (EFSEC) in May 1998.

2.3.2.1 Pipeline Characteristics

The coated steel pipeline would be 35.6 centimeters (cm) (14 inches) in diameter from mile post (MP) 0 to 124.0 (the Thrasher Station to the Kittitas Terminal). The diameter would change to 30.5 cm (12 inches) from MP 124.0 to 231.0 (the Kittitas Terminal to the Northwest Terminalling bulk storage facility in Pasco).

The pipeline would be welded with a minimum yield strength of 52,000 pounds per square inch (psi) and a minimum operating pressure of 1,440 psi. Wall thickness would be a minimum of 0.7 cm (0.281 inch) for the 35.6 cm (14-inch) line, and 0.6 cm (0.250 inch) for the 30.5 cm (12-inch) line. Greater wall thicknesses would be used for added safety at the pump stations, road crossings, railroad crossings, on bridges, and at stream crossings. The pipe would also be protected at appropriate locations by being coated with a protective layer such as concrete, powercrete, high-density polyethylene, and/or CT urethane. Cement coating at stream crossings provides protection and weight to avoid buoyancy. The pipeline would also have a cathodic protection system (a small electrical charge applied to the pipeline) to provide corrosion protection.

2.3.2.2 Pump Stations

Six pump stations would be located along the corridor in Segments 1 (Thrasher Station), 16 (North Bend Station), 25 (Stampede Station), 31 (Kittitas Station), and 34 (Beverly-Burke and Othello Stations) (see Figure 2-1 for station locations). Three of these stations (Thrasher, North Bend, and Kittitas) would be constructed initially, and the others would be constructed over time to increase capacity as demand for more product increases.

The Thrasher Pump Station would be located on about 1.5 hectares (ha) (3.7 acres) and each of the other pump station sites would be about 0.4 to 0.8 ha (1 to 2 acres) in size. Part of each site would be cleared. The Thrasher, North Bend, and Stampede Pump Stations would be enclosed in a building to protect the facility and provide noise abatement. The Kittitas, Beverly-Burke, and Othello Pump Stations would not be enclosed. The stations would be fenced and gated to limit access. These pump stations would be remotely controlled from the pipeline control center and can also be manually operated onsite.

The Thrasher Station (MP 0.0) would be located in south-central Snohomish County, on 46th Avenue and north of 212th Street SE, north of the existing OPL Woodinville Station (Figure 2-2). It would be partially located within existing cleared Puget Sound Energy ROW. Approximately 0.4 ha (1 acre) would require clearing for the pump station. The topography of the site is gently rolling. Surrounding land use is rural residential.

The North Bend Station (MP 35.3) would be located on about 0.4 ha (1.1 acres) south of SE 120th Street and south of the Cedar Falls Trail (Figure 2-3). It would be in a field currently covered with grasses and blackberry bushes used for grazing adjacent to the Cedar Falls Trail ROW. Brush clearing would be required for the pump station. The pump station site would be set back approximately 12.2 m (40 feet) from the edge of the trail, and existing vegetation in the setback area (blackberry bushes) would screen the station from trail users. Surrounding land uses are urban and rural residential. The proposed site is near an existing Puget Sound Energy electrical substation.

The future Stampede Station (MP 67.1), proposed for later construction if needed, would be located near (east of) Stampede Pass Road, east of Lake Easton, in Kittitas County (Figure 2-3). It would be in a partially forested meadow at an elevation of about 731.5 m (2,400 feet). The terrain is relatively flat and minimal clearing would be required. Although the station might not be constructed initially, the block valves that are part of the station would be installed. The proposed site is on private land purchased by OPL and near an AT&T fiberoptic regeneration station.

The Kittitas Station (MP 124.0) would be located at the 10.9 ha (27-acre) Kittitas Terminal at the northeast intersection of I-90 (Exit 115) and Badger Pocket Road (Figure 2-4). It would be on land that is currently used for irrigated agriculture.

The future Beverly-Burke Station (MP 154.1), proposed for later construction if needed, would be located near (south of) Beverly-Burke Road in Grant County about 6.4 km (4 miles) east of the Columbia River. It would be in an area of rangeland that is not currently cultivated. Some brush clearing would be required for construction of the pump station. The site is at an elevation of 335.3 m (1,100 feet). Block valves would be installed during initial construction of the pipeline to accommodate the future installation of the pump station.

The future Othello Station (MP 189.9), proposed for later construction if needed, would be located about 9.7 km (6 miles) southwest of Othello and 670.6 m (2,200 feet) north of State Route 24 in Adams County. The station would be at an elevation of about 365.8 m (1,200 feet) on agricultural land that is currently being farmed. Block valves would be installed during initial construction of the pipeline to accommodate the future installation of the pump station.

2.3.2.3 Block Valves

About 29 block valves would be installed along the pipeline corridor. A typical block valve layout is shown in Figure 2-5. Valve locations are shown in Table 2-3. These valves would be remotely controlled from the pipeline control center and can also be manually operated as they are on the surface. They would enable an automatic response to any detected rupture or hole in the pipeline and would limit the amount of product released. Each block valve site would be a fenced area of approximately 9.1 by 12.2 m (30 by 40 feet). Facilities at the site would consist of a 2.4 by 2.4 m (8- by 8-foot) control building, 8-foot by 8-foot valve vault or aboveground valve, and a power service pole. Utility service to the pump stations would include water, sewer, and electricity, which would be provided by local utilities. In cases where no sewer is available, a septic system would be installed. Power would be brought to the site from adjacent electric utility service distribution lines. Most sites are within one-tenth mile of existing power lines. In the event that commercial power is not readily available, a stored-energy actuator would be used on the block valve in lieu of a motor-operator, and power for the electronics would be developed onsite using a suitable alternative energy source such as solar panels.

Table 2-3. Block Valve Locations, Proposed Pipeline Project

Valve No.	Purpose*	Location	County	Sec/Tw/Rn	Approx. MP
1	Thrasher Station	Maltby Road	Snohomish	SEC21/T27N/R5	0
2	Snoqualmie River, West	Lake Crest/High Bridge Rd.	Snohomish	SEC26/T27N/R6E	8.10
3	Snoqualmie River, West	West Side of Hwy 203	Snohomish	SEC25/T27N/R6E	9.30
4	Cherry Creek	North Side of Cherry Creek Road	King	SEC9/T26N/R7E	16.19
5	Cherry Creek	South of road on edge of property line	King	SEC14/T25N/R7E	23.42
6	Tolt River	Top of hill	King	SEC14/T25N/R7E	24.56
7	Tolt River	East side of Tokul Creek Road	King	SEC20/T24N/R8E	31.86
8	Snoqualmie River	North of trestle bridge; north of Reinig Road	King	SEC29/T24N/R8E	34.06
9	North Bend Station		King		37.32
10	North Bend Station		King		37.34
11	S. Fork Snoqualmie River, West	East side of SE 145th SE	King	SEC23/T23N/R8E	39.42
12		North side of Homestead Road	King	SEC28/T23N/R9E	44.29
13		Near Exit 47 of I-90; north side of Homestead Road[1]	King	SEC13/T22N/R10E	54.80
14	Stampede Station	Stampede Pass Road	Kittitas	SEC22/T21N/R12E	67.07
15	Cabin Creek	West side of Monihan Road; 35 meters south of BNRR	Kittitas	SEC9/T20N/R13E	73.90
16		West side of Cle Elum Ridge	Kittitas	SEC4/T19N/R15E	87.56
17	Yakima River, East	Between I-90 and Thorpe Prairie Rd.	Kittitas	SEC10/T19N/R16E	95.26
18	Yakima River, West	30 meters east of Highway 10	Kittitas	SEC11/T19N/R16E	96.19
19	Currier Creek/North Branch Canal	East Side of Evans (Robbins) Road	Kittitas	SEC27/T19N/R18E	108.73
20	Kittitas Station	Badger Pocket Road	Kittitas	SEC12/T17N/R19E	123.89
21	Kittitas Station		Kittitas		124.09
22	Park Creek/High Line Canal	West side of Stevens Road	Kittitas	SEC14/T17N/R20E	129.82
23	Columbia River, West	West Side of Huntzinger Rd.[2]	Kittitas	SEC18/T16N/R23E	148.39
24	Columbia River,	East of Highway 243[3]	Grant	SEC21/T16N/R23E	150.35

Table 2-3. Block Valve Locations, Proposed Pipeline Project

Valve No.	Purpose*	Location	County	Sec/Tw/Rn	Approx. MP
	East				
25	Beverly Burke Station	Beverly Burke Rd.	Grant	SEC24/T16N/R23E	154.08
26	Unnamed Stream, West	Near Highway 26[4]	Grant	SEC35/T16N/R27E	178.53
27	Lower Crab Creek, North	South side of Highway 26[4]	Grant	SEC8/T15N/R28E	181.69
28	Othello Station		Adams	SEC3/T15N/R27E	189.15
29	Pasco Metering Station		Franklin		231.01

Source: OPL 1998.

* Block valves will be located at pump stations and at crossings of large rivers or streams that have a large number of water withdrawals.

Notes: administered federal lands
[1] U.S. Forest Service
[2] Bureau of Land Management
[3] Bureau of Reclamation
[4] U.S. Fish and Wildlife Service

Block valves are placed at low points near environmentally sensitive areas where potential spill volumes can be reduced. Block valve placement can reduce spill volumes due to pipe rupture. They are expensive and, as a valve fitting, provide another potential leak point (for small leaks). Numbers and placement of valves involve a balance between cost, risk, and impact. The volume of product per mile of 12-inch- and 14-inch-diameter lines is approximately 2,900 and 4,000 bbl, respectively.

Agencies have indicated concern about potential product spills into Keechelus Lake (MP 59.5 to MP 65.5) and requested installation of another block valve between the Tinkham Road valve (#13 at MP 54.8) and the Stampede Pass Pump Station (#14 at MP 67.07) to reduce the size of a potential spill. Thus, it is recommended that OPL install another block valve west of MP 59 to meet this request and reduce the quantity of a potential spill by reducing potential spill volume and reducing hydraulic head pressure along the lake.

2.3.2.4 Kittitas Terminal

The Kittitas Terminal (MP 124.0) would occupy about 10.9 ha (27 acres) currently used for irrigated agriculture north of and adjacent to I-90 and east of Badger Pocket Road (Figures 2-1 and 2-4). The terminal would ultimately have nine aboveground liquid petroleum storage tanks 14.6 m

(48 feet) high and 30.5 to 45.7 m (100 to 150 feet) in diameter, with a total storage capacity of 36,120,000 gallons of product. In addition, one 420,000 gallon transmix/relief tank (9.1 m [30 feet] high and 15.2 m [50 feet] in diameter) would also be included. The terminal also includes truck loading racks and parking for tanker trucks.

Initial onsite construction of the Kittitas Terminal (Figure 2-4) would include the construction of:

- five large storage tanks (two regular gasoline, one premium gasoline, one LS diesel, and one HS diesel),
- one small transmix tank and one small ethanol tank,
- an office/warehouse building with restrooms,
- a control building,
- a 45.7 by 45.7 m (150- by 150-foot) substation,
- three loading racks,
- two metering facilities,
- an oil/water separator,
- a stormwater basin measuring 52.1 by 106.7 by 0.9 m (171 by 350 by 3 feet deep), and
- connections to public water and sewer systems.

As demand required, the remaining large diesel tank, turbine fuel tank, and gasoline tank would be added for ultimate buildout.

2.3.2.5 Pasco Delivery Facility

The Pasco Delivery Facility would occupy about 0.4 ha (0.9 acre) near the intersection of U.S. Highway 12 on Sacajawea Park Road, across the road from the Northwest Terminalling Facility in Pasco. The site is level with minimal vegetation and is now unused. The facility would have metering equipment, a 2.4 by 12.2 m (8- by 40-foot) sample building, a 3.7 by 10.7 m (12- by 35-foot) control building, and other equipment. Two lines would connect to the Northwest Terminalling Facility, one for diesel fuel and one for gasoline.

2.3.2.6 SCADA System

The pipeline would be continuously monitored (24 hours per day for 365 days per year) by operational staff at the OPL Renton facility using a detection system called a Supervisory Control and Data Acquisition (SCADA) system. This system detects anomalies in the flow of product through segments of the pipeline, based on rapid drops in pressure or other parameters (such as temperature or product characteristics) within the detection limits of the system. If an anomaly is detected by the system, the pipeline can be shut down automatically or by direction from staff until that portion of the pipeline can be inspected for leaks and any necessary repairs can be made. The line can be shut down in 5 minutes or less upon activation of block valve closure. There are limits to the leak size detectable by the system. For example, a leak of less than 1 percent of flow (600 bbls per day [25,200 gallons]) may not be immediately detectable by the system. Such leaks would only be detected by fluid balance measurements, routine visual inspections, or citizen reporting.

2.3.3 Construction

2.3.3.1 Pipeline Overview

Construction Progress. Construction of the pipeline would take about 1 year and cost slightly more than $105 million. The anticipated duration of pipeline construction at any one location along the corridor would be no more than 10 days except for larger water crossings where more time is needed. Construction progress would be slowest at road and waterway crossings, where several days may be required to complete the crossing by either boring or trenching. Construction progress in flat open terrain might be completed in as little as 2 to 3 days. Construction would start and end in early spring, as previously proposed.

OPL proposes to have construction occur in three spreads, and a variety of crews within those spreads, to enable construction to occur concurrently at various places along the pipeline. Table 2-4 shows timing restrictions (construction windows) for the project.

Spread 1 is generally comprised of the western portion of the pipeline and includes three counties: 22.5 km (14.0 miles) in Snohomish County, 29.6 km (18.4 miles) in the northeastern portion of King County, and 74.0 km (46.0 miles) in the central portion of Kittitas County. It would require a peak construction workforce of 375. Under favorable weather conditions, construction would occur at a rate of 3.1 to 3.7 km (1.9 to 2.3 miles) per day and would take a total of about 1.75 months.

Spread 2, which is generally the central portion, is comprised of the mountainous segment of the pipeline, buried within the Snoqualmie Pass Tunnel (Figure 2-6) over Snoqualmie Pass, as well as major river crossings. It includes 39.6 km (24.6 miles) in the eastern portion of King County and 29.6 km (18.4 miles) in the western portion of Kittitas County. It would require a peak workforce of 159 workers and would be constructed at a rate of 0.6 km (0.4 mile) per day for a total of 4.33 months.

Spread 3, the eastern portion of the pipeline, includes 45.2 km (28.1 miles) in the eastern part of Kittitas County, 49.1 km (30.5 miles) in Grant County, 15.1 km (9.4 miles) in Adams County, and 66.1 km (41.1 miles) in Franklin County for a total of 175.5 km (109.1 miles). It would require

375 workers during the peak and would be constructed at a rate of 3.1 to 3.7 km (1.9 to 2.3 miles) per day for a total of about 2 months.

Table 2-4. Exclusionary Periods for Construction and Operational Activities for the Proposed Action

Resource Area	Restriction	Exclusionary Period
Construction:		
Wildlife and T&E Species (peregrine falcon)	Do not construct near Columbia River peregrine falcon nesting areas without conducting clearance surveys.	February - July
Wildlife and T&E Species (sandhill crane)	Do not construct within areas mapped by WDFW as priority sandhill crane habitat unless authorized by WDFW.	Early March - mid-May, mid-September - early November
Wildlife and T&E Species (general birds)	Limit vegetation clearance for birds protected under the Migratory Bird Treaty Act unless clearance surveys are done within 10 feet of clearing areas and approved by agencies.	March 15 - July 15
Wildlife and T&E Species (raptors)	Do not construct within 0.25 mile of raptor nests unless clearance surveys are done.	March 15 - July 15
Wildlife and T&E Species (northern spotted owl)	Prohibit construction within the range of the northern spotted owl within 0.25 mile of suitable nesting habitat unless surveys have been completed and approved by the USFWS.	March 15 - August 1
Wildlife and T&E Species (northern spotted owl)	Prohibit blasting during the northern spotted owl nesting season anywhere within USFS lands unless approved by the USFWS.	March 15 - August 1
Wildlife and T&E Species (burrowing owl)	Do not construct within 0.25 mile of active burrowing owl nest sites.	March 15 - August 15
Wildlife and T&E Species (sensitive species)	Do not clear during the spring nesting season for sensitive species (i.e., northern goshawks, prairie falcons, ferruginous hawks, red-tailed hawks, burrowing owls, long-billed curlew, and sandhill cranes), without clearance surveys.	April 1 - July 15
Wildlife and T&E Species (marbled murrelet)	Prohibit construction within the range of the marbled murrelet unless approved by the USFWS on a case-by-case basis.	April 1 - September 15
Wildlife and T&E Species (marbled murrelet)	Prohibit blasting anywhere within USFS lands during the marbled murrelet nesting season unless approved by the USFWS.	April 1 - September 15
Fisheries	Do not construct in the Columbia River.	April 1 - October 15
Fisheries	Do not construct in the Keechelus Lake Tributaries.	August 16 - July 31
Fisheries	Do not construct in Cabin Creek, Big Creek, or Little Creek.	September 1 - June 30
Fisheries	Do not construct in Little Bear Creek.	October 1 - June 14
Fisheries	Do not construct in stream crossings in Snohomish County.	October 1 - June 14

Table 2-4. Exclusionary Periods for Construction and Operational Activities for the Proposed Action

Resource Area	Restriction	Exclusionary Period
Fisheries	Do not construct in stream crossings in Kittitas County.	October 1 - June 14
Fisheries	Do not construct in stream crossings in Grant County.	October 1 - June 30
Fisheries	Do not construct in stream crossings in Franklin County.	October 1 - June 30
Fisheries	Do not construct in stream crossings in Adams County.	October 1 - June 30
Fisheries	Do not construct in the Yakima River or Swauk Creek.	October 1 - August 31 (October 1 - September 14 preferred)
Wildlife and T&E Species (snakes)	Do not disturb snake hibernacula, coordinate with WDFW and USFWS where this conflicts with other species.	October 15 - May 1
Fisheries	Do not construct in stream crossings in King County.	October 16 - June 14
Wildlife and T&E Species (bald eagle)	Do not construct within 100 m of Snoqualmie, Tolt, South Fork Snoqualmie, Yakima, or Columbia Rivers; Keechelus Lake; or lower Crab Creek unless daily clearance surveys are done to determine no wintering bald eagles are present within 100 m of construction or 1,000 m of blasting.	November 1 - March 15
Operation:		
Wildlife and T&E Species (nesting birds)	Do not conduct tree cutting maintenance during the nesting season unless clearance surveys are conducted to verify no nests are present.	March 15 - July 15
Wildlife and T&E Species (wintering deer)	Do not drive through wintering deer range.	When snow cover averages greater than 2 feet

The construction time frame on any spread would exceed these schedules if certain construction windows, across streams, for example, cannot be met in the time period indicated.

Staging Areas and Crew Yards. Pipeline would be transported by rail to four or five pipe staging areas measuring approximately 6.1 to 12.1 ha (15 to 30 acres) each. Pipe staging areas are locations where the pipe joints can be unloaded from railcars and temporarily stored while they await distribution (stringing) along the ROW. Potential staging areas near active or to-be-refurbished rail sidings include Everett, Easton, Ellensburg, Royal City, and Pasco. The final selection of staging sites would be based on the condition of the rail sidings, the availability of land to stack pipe, the proximity to an improved highway, and location relative to the construction spread. Pipeline would be transported daily by tractor trailer to be placed along trenches for assembly and carried to the trench by pipe-laying equipment.

In addition to pipe staging areas, contractors would have construction crew staging yards measuring 4.1 to 8.1 ha (10 to 20 acres) for office trailers and workcrew parking. The contractors would locate and make arrangements to secure a yard area for use by construction crews; it is anticipated that the contractors would seek disturbed (developed, paved, etc.) sites. This area would be used to locate office trailers, storage trailers, and fuel tanks, and would operate as an assembly point for construction crews to meet prior to proceeding on to the ROW.

Construction Corridor and Pipe Depth. The construction would occur within a pipeline corridor that is 18.3 m (60 feet) wide or less, depending upon the width of the available corridor (such as in Tinkham Road which is a 3.1 to 6.1 m [10- to 20-foot] wide U.S. Forest Service road). In general, a 60-foot construction easement is required to allow for the following:

Stockpile excavated material	4.6 m (15 feet)
Excavated trench	1.5 m (5 feet)
Fabricated pipe string	1.5 m (5 feet)
Construction equipment maneuvering	4.6 m (15 feet)
Construction vehicle traffic lanes	6.1 m (20 feet)
Required construction easement	18.3 m (60 feet)

The pipeline would be placed a minimum of 3.1 m (10 feet) below the six major riverbed crossings (from the top of the pipe to the riverbed), 1.2 m (4 feet) deep at other creek and water crossings, 1.8 m (6 feet) (from the top of the pipe to the ground) below railroad crossings (Figure 2-7), and 1.2 m (4 feet) below agricultural and other lands (OPL 1998). River and stream crossings under any conditions would be placed a minimum of 0.6 m (2 feet) below projected maximum scour depths. Specific scour depth potential would be determined during design.

Welding and Pipe Trench. Sections of coated steel pipeline measuring 12.2 m (40 feet) would be welded together (on level terrain) in 182.9 to 274.3 m (600- to 900-foot) pipeline sections next to the open trench using at least four layers of full-penetration arc welds. Shorter segments would be handled at crossings or steep terrain. The welds would be X-rayed and coated, and the pipeline would then be placed in the trench. The pipe would be placed in a bed of soft material (crushed rock, sand, and other materials), comprising at least 15.2 cm (6 inches) of material in the bottom of the trench (below the pipe) and covering the pipe to at least a foot, before backfill material is placed over it. Trench plugs would be used as necessary to prevent flow of water along sloped portions of the pipeline trench. In addition, a trench bottom sealing material, trench lining, or construction techniques such as a combination of compaction materials, would be used in certain wetland areas (see Wetlands) to avoid draining a perched wetland. The site would then be returned to its original contour, mulched, and reseeded or revegetated as soon as possible after construction is completed (from a few days for reseeding up to 6 months for more difficult revegetation). Areas would be reseeded or replanted as necessary until restoration was complete.

Access. No new access roads would be constructed or maintained for the proposed petroleum product pipeline. Existing roads would be used wherever possible. The width or quality of existing roadbeds would not be improved unless it became part of an agreement with the U.S. Forest Service or other landowner. In the event that a closed road is temporarily opened for construction, it would again be closed upon completion of construction. Access via roads closed in winter would be via snowmobile. Existing open roads would remain open after construction was completed.

Signage and Ground Monitoring. Warning signs would be frequently placed to mark the location of the pipeline at fence lines and trails. The intent is that a person standing on the pipeline would be able to see a warning sign in either direction. Stream gauges would be installed on the pipe to detect compression and tension due to soil movement. Ground displacement and groundwater level would be monitored in situ to detect erosion or potential slide problems.

Watercourse Crossings. The pipeline would cross many areas requiring specialized construction approaches, including about 78 wetlands and nearly 300 streamcourses (rivers, streams, and canal crossings). Crossing methods include boring under streams, cutting through streams, and bridging over streams. Watercourse crossings that require special construction techniques due to physical conditions are summarized in Table 2-5. River crossings would include two for the Snoqualmie River, two for the South Fork Snoqualmie River, two channels across the Tolt River, once across the Yakima River, and once across the Columbia River. Buttresses would be installed at the toe of slopes where appropriate, to prevent slope movement. Alternatively, slope grades could be flattened.

Several methods for crossing sensitive areas would be used. Most river and stream crossings would use diversion and trenching methods, such as stream diversion and trenching, flume diversion and trenching, and channel isolation and trenching (Figures 2-8 and 2-9). Typically, wet trenching (cutting through streams) would be used for streams with low flows and diversional trenching (diverting flows before cutting) would be used for larger streams. The technique would depend on the amount of water to be managed.

Horizontal directional drilling is planned for the Columbia River, and as an alternative method for the Snoqualmie River if the bridge crossing cannot be used. Drilled crossings avoid instream impacts but require much shoreline area disturbance. Drilled crossings require a minimum of a 30.5 by 76.2 m (100- by 250-foot) area on the drilling side of the crossing and 53.3 by 30.5 m (175 by 100 feet) on the opposite side to prepare and pull the pipe. The large cleared staging area on the drill side is needed for the drilling equipment, support equipment, and a sump for drilling muds. The cleared area on the other side of the river is needed for a sump and to fabricate and test the section of pipe that would be pulled under the river. Sump areas are required to contain the drilling fluids. Thus, decisions to avoid instream trenching options result in riparian clearing options.

Total construction time for crossing a particular stream or river could take a total of 4 to 5 weeks, from site clearing/preparation to restoration, but the actual time required to place the pipeline in a stream crossing could take 48 hours or less. Due to flows, weather, and allowable construction windows across rivers, some crossing construction would be independent from, and at some distance from, activity along the construction spreads.

Twelve river crossings would use existing bridges, attaching the pipeline to these structures (Figure 2-10). Very little riparian habitat would be removed, and no in-channel work would occur at these bridge crossings.

Table 2-5. Summary of Major Rivers and Unique Crossing Construction Methods, Proposed Pipeline Project

	Crossing Geometry			
Stream Name	**Bank to Bank Width**	**Bank Height**	**Depth**	**Crossing Method**
Snoqualmie River Crossing #1	200'	15'	6 to 8'	Preferred: Bridge Alternative: Horizontal directional drill
Peoples Creek				
Crossing #1	10'	15'	1'	Over culvert
Crossing #2	10'	10'	1'	Open cut w/flume
Griffin Creek	10'	1 - 2'	1'	Open cut w/diversion
Tolt River	40' main channel 30' secondary channel	6' (riprap along north bank)	1 to 2'	Open cut w/diversion
Tokul Creek	30'	20'	2 to 3'	Bridge
Snoqualmie River Crossing #2	120'	10 to 20'	8 to 10'	Bridge crossing
South Fork Snoqualmie River Crossing 1	500' main channel	15 to 20'	4 to 5'	Bridge crossing
South Fork Snoqualmie River Crossing 2	120' 300' secondary channel	60'	3 to 4'	Bridge crossing
West Slope of Snoqualmie Pass - several creeks: Boxley Creek - w/flume or diversion Change Creek - bridge Hall Creek - wet trench Mine Creek - wet trench Rock Creek - w/diversion[1] Harris Creek - w/diversion[1] Carter Creek - w/flume or diversion Hansen Creek - w/flume or diversion[1]	10 to 50'	2 to 12'	dry to 2' with large boulders	
Humpback Creek[1]	25'	3'	2 to 3', fast flowing with large boulders	Wet trench
Roaring Creek[1]	60 to 80'	20'	20 to 30'	Open cut w/diversion
Meadow Creek[1]	120'	15'	2 to 3'	Open cut w/diversion
Cabin Creek	20'	1 to 2'	1 to 2' adjacent to wetland	Open cut w/diversion
Yakima River	200'	4'	3 to 6'	Open cut w/diversion
Columbia River alternative locations:				
Preferred: Below Wanapum Dam[2]	2,100'	40 to 45'	15 to 25'	Preferred: Horizontal directional drill
Four Alternatives 1. I-90 Bridge[2] 2. Beverly Railroad Bridge[2] 3. Upstream of I-90 Bridge[2] 4. Wanapum Dam[3]	4,350'	shallow bank	105'	Four Alternatives: 1. Cross on I-90 Bridge 2. Cross on Beverly Railroad Bridge 3. Wet trench upstream of I-90 Bridge 4. Cross on Wanapum Dam

Administered federal lands:
[1]U.S. Forest Service
[2]U.S. Bureau of Reclamation
[3]Grand County P.U.D.

Source: OPL 1998.

Other Pipeline Crossings. Unlined irrigation canals with low flow rates would be crossed by open cut methods. If flow rates are high, the crossing would be done using boring and jacking. Concrete irrigation canals would be crossed under the canal using boring and jacking techniques, where feasible. Unfavorable subsurface conditions at concrete canal crossings may require spanning a canal.

The boring and jacking method requires a starting and ending pit. The pits are excavated to a desired depth that would allow horizontal movement of the pipe under the water body. The areas for the starting and ending pits would be cleared of all vegetation and would be about 3.0 by 3.0 m (10 by 10 feet) for the bottom of the receiving pit and about 6.1 by 15.2 m (20 by 50 feet) for the bore pit. Canals would be bored using conventional auger boring or guided boring techniques unless subsurface conditions are unfavorable (i.e., rock, gravel, glacial till, or high water tables with flowing sands).

Railroad crossings would be installed using the jack and bore method only. The pipeline would be bored under federal and state roadways, such as I-90. The pipeline would be trenched through county, local, and private roads.

Other crossing techniques may include flexible couplings, greater buried depth (below slide depth), and culvert crossing upgrades.

Pipeline Testing. The pipeline at each water crossing would be hydrostatically tested at least twice. The pipe would be constructed, tested, placed in the trench, backfilled, and then tested again. Many crossings would again be tested as part of the testing of 10 longer pipeline segments once they are completed. The hydrostatic test would be done by sealing the end of the pipe section, filling it with water, applying 125 percent of the maximum operational pressures, and holding that pressure for 4 hours, or 8 hours if the pipeline has already been buried. Water at that pressure would be likely to show leaks immediately. A drop in pressure over the 4- to 8-hour test would also show a leak. Any leaks in the pipeline would be repaired by pipe or valve replacement until subsequent tests confirmed the absence of leaks. The test water would then be pumped out and, where possible, reused in subsequent segment tests.

A total of 1.5 million gallons of water would be needed to test the pipeline, plus 4.2 million gallons to test the tanks at the Kittitas Terminal. Water needed to conduct the hydrostatic testing would be obtained, if possible, from the following sources (Table 2-6):

- Snoqualmie River - 1.23 million gallons (3.76 acre-feet)
- City of North Bend - 32,583 gallons (0.10 acre-feet)
- Cascade Irrigation Canal - 166,173 gallons (0.51 acre-feet) (pipeline)
- Waluke Branch Canal - 237,855 gallons (0.73 acre-feet)
- Cascade Irrigation Canals 4.2 million gallons (12.9 acre-feet) (Kittitas Terminal)

Potential secondary sources of water, in the event that the above sources are not fully available, include the Alderwood Water District, Woodinville Water District, City of Carnation, City of Ellensburg, Port of Royal Slope, and the City of Othello.

Table 2-6. Hydrostatic Testing Cross-Country Segments

Segment Number	Description	Mile Post Start - End	Segment Length (miles)	Water Source	Total Quantity Needed for Segment Testing	Quantity Added to Previous Segment Test Water	Amount Available for Testing of Next Segment	Discharge Location	Discharge Quantity
1	Thrasher to Snoqualmie River	0 - 8.3	8.3	Snoqualmie River	1.08 a-f (351,895 g)	1.08 a-f (351,895 g)	1.08 a-f (351,895 g)	None	0.00 a-f
2	Snoqualmie River to North Bend Pump Station	8.3 - 37.3	29.0	Snoqualmie River (2.68) plus water used for Segment 1	3.76 a-f (1.23 million g)	2.68 a-f (847,155 g)	3.76 a-f (1.23 million g)	None	0.00 a-f
3	North Bend Pump Station to Stampede Pump Station	37.3 - 67.1	29.8	City of North Bend (0.10) plus water used for Segment 2	3.86 a-f (1.26 million g)	0.10 a-f (32,583 g)	3.86 a-f (1.26 million g)	None	0.00 a-f
4	Stampede Pump Station to Monahans Road	67.1 - 73.9	6.8	Supplied from Segment 3 Test Water	0.88 a-f (286,729 g)	0.00 a-f	3.65 a-f (1.19 million g)	Stampede Station	0.21 a-f
5	Monahans Road to Thorpe Prairie Road	73.9 - 95.3	21.4	Supplied from Segment 3 Test Water	2.77 a-f (902.546 g)	0.00 a-f	3.65 a-f (1.19 million g)	None	0.00 a-f
6	Thorpe Prairie Road to Kittitas Terminal	95.3 - 123.4	28.1	Supplied from Segment 4 and 5 Test Water	3.64 a-f (1.19 million g)	0.00 a-f	3.65 a-f (1.19 million g)	None	0.00 a-f
7	Kittitas Terminal to Ginkgo State Park	123.4 - 141.8	18.4	Supplied from Segment 6 Test Water	1.98 a-f (645,141 g)	0.00 a-f	3.26 a-f (1.06 million g)	Kittitas Terminal	0.39 a-f
8	Ginkgo State Park to Beverly-Burke Pump Station	153.7 - 188.8	11.9	Supplied from Segment 6 Test Water	1.28 a-f (417,061 g)	0.00 a-f	3.26 a-f (1.06 million g)	None	0.00 a-f
9	Beverly-Burke Pump Station to Othello Pump Station	153.7 - 188.8	35.1	Supplied from Segment 7 and 8 Test Water plus water (0.51) from the Cascade Irrigation Canal	3.77 a-f (1.23 million g)	0.51 a-f	3.77 a-f (1.23 million g)	None	0.00 a-f
10	Othello Pump Station to Pasco Delivery Facility	188.8 - 230.7	41.9	Supplied from Segment 9 plus water (0.73) from the Wahluke Branch Canal	4.50 a-f (1.47 million g)	0.73 a-f	0.00 a-f	Indirectly to Snake River from Pasco Delivery Facility	4.50 a-f

Source: OPL 1998. Note: g = gallons, a-f = acre-feet.

After testing is complete, the test water would be analyzed for parameters such as pH, oil and grease, or other tests as required by permitting agencies and filtered before being discharged into a water body. Hydrostatic test water would be discharged into three locations: into the ground at the Stampede Pump Station (0.21 acre-feet), into the ground onsite or to the stormwater pond at the Kittitas Terminal or into the Cascade Irrigation Canal near the terminal (0.39 acre-feet) and indirectly (through filtration) into the Snake River at the Pasco Terminal (4.5 acre-feet).

X-ray welding is another form of testing. OPL will require all welding be X-ray tested to check for weld quality and potential flaws.

2.3.3.2 Pump Stations and Block Valves

Once the pump units are installed, the pipe connections, valves, and metering equipment would be installed. About 20 workers would construct each of the three initial pump stations (Thrasher, North Bend, and Kittitas) concurrently with the construction of the pipeline. Construction of the three pump stations would require about 8 months. Construction of the Kittitas Pump Station would occur concurrently with construction of the Kittitas Terminal. The three remaining pump stations (Stampede, Beverly-Burke, and Othello) may be built in the future if demand for pipeline capacity increases to the point of maximum pumping capacity. These pump stations could be built independently of each other.

Construction of the metering station outside of the gate of the Northwest Terminalling Facility in Pasco would require an additional 8 to 10 workers. Construction of this station would also occur in conjunction with pipeline construction and would take about 30 days.

2.3.3.3 Kittitas Terminal

The entire terminal site would first be cleared and graded during the first and second months of the construction schedule. Construction on the site would include fencing the area and then excavation and pouring of foundations to support the equipment and containment berms. About 15 people, in two workcrews, would work on tank fabrication. Tank fabrication would be completed in 6 months. Tank integrity would be tested using the hydrostatic test method (discussed below).

Construction of other terminal facilities (e.g., piping, buildings, and mechanical and electronic components) would begin 1 month later than the tanks and also last for 6 months. Most of the equipment (e.g., scraper traps, station boosters, and mainline pumps) would be manufactured offsite and trucked to the terminal for installation. The peak construction workforce for these other terminal facilities would be an additional 30 people.

The Kittitas Terminal is located within the Cascade Canal District. The District is privately owned by property owners in and near Kittitas. As an owner of property (the terminal site) near Kittitas, OPL would also have rights to use water from the canal, which could be used as a source of water for hydrostatic testing of the tanks. Approximately 4.2 million gallons of water would be needed. It could be obtained from the canal at a rate of 5,000 gallons per minute (gpm), which would require 14 hours to fill the tanks.

Preliminary discussions with the Canal District have indicated that obtaining water at a rate of 5,000 gpm during either the spring or fall would not impact downstream users. To access the water, a temporary line would be installed between the site and the nearest point on the canal, a distance of approximately 0.61 km (0.38 mile).

The water would be retained onsite until all tanks are completed and tested, which would take approximately 60 to 90 days. The water would be tested in the tank. If water quality tests showed that the water was within acceptable parameters, it might be discharged at a controlled rate back to the irrigation canal. As an alternative, the water could be pumped, after filtering, into the onsite retention pond at a controlled rate and allowed to evaporate. The retention pond would be approximately 1-1/2 acre-feet deep and would be adequately sized to hold the test water in addition to sizing requirements related to tank capacity, rainfall capacity, and excess capacity, as required.

2.3.4 Operation

This section describes operation of the pipeline and associated facilities, including maintenance, inspection, and spill response.

2.3.4.1 Renton Facility, Kittitas Terminal, and Pasco Delivery Facility

Pump stations would be controlled remotely from the OPL Renton facility and also controlled locally. The four OPL employees assigned to the OPL Renton facility would be responsible for local control and monitoring of product movements through the pipeline system. Four workers would be employed at the Kittitas Terminal during operation of the pipeline to handle incoming tanker truck loading activities. Two employees would be assigned to the Pasco Delivery Facility.

2.3.4.2 Pipeline Maintenance

An additional 6 to 10 OPL employees would be responsible for maintenance of the pipeline and the ROW. The width of the corridor to be maintained (i.e., the permanent easement) for the pipeline is 9.1 m (30 feet). The 30 feet would allow vehicles to access the area directly above the pipeline in the case of an emergency or for special inspection activities, and would enable small-scale excavation of the pipeline where necessary for visual inspection and/or repair. Areas such as wetlands and farmland would not need maintenance clearing. Routine maintenance along the ROW would include visual inspection, periodic clearing of vegetation, repairs to ROW markers, and inspection and maintenance of the cathodic protection system.

Details of vegetation maintenance would be established with state and federal agencies. In general, herbicide use would be minimized in favor of mechanical clearing. Trees would be kept down, but other vegetation could be maintained. A 5-year monitoring plan for revegetation, including contingency plans, would be developed and implemented. Parameters to be monitored would include the success of replanted vegetation, invasive species, and damage to remaining vegetation along the corridor, such as blowdown or erosion of topsoil. Additional erosion/sediment control and revegetation would be provided as necessary.

Visual inspection of the pipeline would include ground patrols and fixed-wing aircraft inspections (at an average height of 304.8 m or 1,000 feet above ground level) about once every 2 weeks, depending on weather conditions, to ensure that there was no unauthorized encroachment onto the ROW. During these patrols and aerial inspections, ground slope and river channel profiles would be monitored for stability. Such visits could detect a leak from odor or dead vegetation if the leak was below SCADA detection limits. A circular, computerized sensing device (Asmart pig@) would also be used infrequently (at 5-year intervals unless some event indicated the need to do so more frequently) to internally scan and detect corrosion, dents, or other defects in the pipeline wall so that repairs could be made before a leak occurred. Monitoring specifics would be developed in permit documents.

No new access roads would be constructed or maintained for the project. Existing open roads would continue to remain open during project operation and would be maintained by the existing responsible agency (unless otherwise agreed to with an agency). Previously closed roads used during construction would again be closed during operation. Roads that are open in the summer but are not plowed in the winter and are closed, would continue to be allowed to close in the winter. In areas where continued winter access is required by OPL, such as using Forest Service Road 54 to access the Stampede Pass Pump Station, snowmobiles would be used to access the site. Such access to the pump station could occur as much as once per day, but is more likely to occur once or twice a week.

OPL would also contract with individuals or hire employees who live along the pipeline to respond to a spill within 1 hour of notification in accordance with state policy. It is OPL's policy to maintain a 60-minute response time. It is not known where these employees would be located or exactly how many contract employees would be hired.

2.3.4.3 Pump Stations and Block Valves

Pump stations and block valves would be electric. They would be controlled remotely from the OPL Renton facility but could also be controlled manually onsite. The control buildings for block valves would house electronic equipment used to remotely monitor the various instruments at the site and control the position in the block valve. They would also house an uninterruptible power supply, which would energize the electronics in the event of a commercial power outage, and a telecommunications interface to the pipeline system=s SCADA network.

Power would be brought to the sites from adjacent electric utility service distribution lines. In the event that commercial power was not readily available, a stored-energy actuator would be used on the block valve in lieu of a motor-operator, and power for the electronics would be developed onsite using a suitable alternative energy source such as solar panels. The stored-energy actuators would be designed to use nitrogen pressure to close the valve and a spring to open the valve.

Sufficient nitrogen would be provided to support multiple operations of the valve and to be replenished before the pressure dropped below the minimum operating point. The nitrogen pressure would be remotely monitored to support this maintenance function.

The maximum achievable flow rates for the pipeline during operation are provided in Table 2-7. The operating capacity is anticipated to be 80 percent of the mean achievable flow rate for the Thrasher Station to Kittitas segment (MP 0.0 to 124.0) and 91 percent for the Kittitas to Pasco segment (MP 124.0 to 231.0). Operating capacity is the amount of product all types that can be pushed through the line in various batches and mixed product compared to the design capacity of the line. A single product flowing 100 percent of the time would probably have an operating capacity of 100 percent but this will not occur with the OPL line.

Table 2-7. Achievable Flow Rates (barrels per hour)

Segment	Diesel	Gasoline	Mean
Thrasher to Kittitas	5,227	6,785	6,064
Kittitas to Pasco	4,635	6,100	5,417

Source: OPL 1998.

2.3.5 Construction and Operational Costs

The costs of constructing the proposed pipeline, pump stations, Kittitas Terminal, and the Pasco Delivery Facility are estimated by OPL at $105.1 million (Table 2-8). Of this total, $84.9 million would be spent constructing the pipeline portion of the project and $12.6 million would be spent on the pump stations, Kittitas Terminal, and the Pasco Delivery Facility. About $5.6 million of this total would be spent on local non-labor procurements (i.e., construction materials and services) and $7.6 million in local sales and use taxes.

Table 2-8. Pipeline Project Costs, by County

County	Component	Cost ($)	Pipeline Mileage
Snohomish	Pipeline (14")	5,130,002	14.0
	Pump Station	869,840	
	Subtotal	5,999,842	
King	Pipeline (14")	15,939,650	43.5
	Pump Station	852,121	
	Subtotal	16,791,771	
Kittitas	Pipeline (14" & 12")	33,894,658	92.5
	Terminal	10,304,895	
	Subtotal	44,199,553	
Grant	Pipeline (12")	11,364,537	30.5
Adams	Pipeline (12")	3,502,513	9.4
Franklin	Pipeline (12")	15,060,221	41.1
	Delivery facility	603,959	
	Subtotal	15,644,180	
Total Pipeline Sections		84,891,581	231.0
Total Other Facilities		12,630,815	
Sales Tax		7,596,951	
Grand Total		105,119,347	

Source: Based on Application for Site Certification (OPL 1998).

Transport of petroleum products to eastern Washington by the proposed pipeline during operation is estimated to cost shippers $1.50 per barrel (Table 2-9) although actual tariffs will be approved by utility regulators. An estimated $310,000 would be paid in property taxes each year by OPL.

Table 2-9. Estimated Costs of Transporting Petroleum Products under the No Action and Proposed Project Alternatives

Alternative	No Action - Pipe plus River Barge	No Action - Sea-going Barge plus River Barge	Rail Transport	Proposed Pipeline
Pipe Transport	$0.40/barrel	N.A.	N.A	$1.25/barrel
Sea-Barge Transport	N.A.	$1.25/barrel	N.A.	N.A.
River Barge Transport	$1.15/barrel	$1.15/barrel	N.A.	N.A.
Rail Transport	N.A.	N.A.	$2.95/barrel	N.A.
Handling ($0.25 at each transfer)	$0.50 (2 transfers)	$0.50 (2 transfers)	$0.50 (2 transfers)	$0.25 (1 transfer)*
Total Cost Per Barrel	$2.05	$2.90	$3.45	$1.50

N.A. = Not applicable.
* OPL has provided costs of $0.25 and $0.27 for terminal charges at Pasco.
Source: Analysis of Alternatives (OPL 1998).

2.3.6 Mitigation Associated with the Proposed Action

OPL has already incorporated a number of measures into the project design during siting of the pipeline and design of other project facilities, as described in Appendix C. These measures have included micrositing the pipeline (i.e., minor movement in its location to avoid or minimize local impacts, see Appendix E), implementing best management practices, and other measures. A number of the route improvements within the proposed corridor were made based upon the findings from additional field studies and after consultation with federal, state, and local agencies and property owners. This micrositing will continue and, where proposed, future mitigation plans will provide additional measures. The measures described in Appendix C are considered part of the proposed action. Additional mitigation is suggested, if deemed necessary, within Chapter 3 of this EIS.

2.4 NO ACTION

2.4.1 Ability of the No Action Alternative to Meet the Purpose and Need

Under No Action, the proposed Cross Cascade pipeline would not be constructed. Shippers would continue to receive refined product from northwest refineries under the current system of pipeline and/or trucking and barging. Shippers in eastern Washington would pay more per barrel than they would with the proposal (see Table 2-9). In addition, all OPL shippers would continue to be prorated due to the lack of capacity of the existing pipeline system. To receive needed product, shippers would meet their transportation needs with more tanker trucks, ships, Puget Sound barges, and barges along the coast and up the Columbia River. This would be a more expensive and less efficient transportation system than the proposed pipeline. Shippers would receive their product except during transport closures but would not receive all product ordered via pipeline because the existing line is oversubscribed.

The No Action Alternative is described in the next section, and criteria used to evaluate petroleum transportation alternatives and components are discussed in more detail at AAlternatives Considered but Eliminated from Detailed Study@ later in this chapter. Some of the criteria are discussed here as they apply to the No Action Alternative=s ability to meet the Purpose and Need defined in Chapter 1.

Cost Effectiveness. Shippers are requesting a system that costs less than current truck and barge systems. Because this project is proposed to reduce existing shipping costs, alternatives which cost less than existing are cost-effective to various degrees and those costing more are not. As shown in Table 2-9, it would cost an estimated $0.55 more per barrel to transport product to Pasco under No Action than with the proposed pipeline. Neither No Action nor the proposal has any significant effect on per gallon fuel prices to the public, although annual cost differences can be substantial. From the shippers= standpoint, No Action is less cost-effective than the proposal because the existing cost of transporting would be reduced by the project at no cost to the shipper. It cannot be said that No Action is not cost-effective at all because it is occurring today (i.e., shippers are transporting petroleum products via other modes). Shipping methods such as pipelines are generally more cost-effective and they become even more so over time because they are more efficient than other modes of transport.

Efficiency. No Action is a less efficient and less direct delivery system because it represents a system of pipeline overcapacity supplemented by multiple modes of transport and more transfers than a point-to-point pipeline. There are minor problems with No Action such as oversubscription with delays and multiple transfers, and the reliability of delivery would continue to degrade slightly with more and more trucks and barges. Such problems include weather, slide, and avalanche closures of I-90 which stop trucks dozens of times per year, and lock maintenance and high river flow closures that occasionally stop barges. Because tanker trucks and barges have been and can continue to be less reliable on occasion, they are not as efficient as a system such as a pipeline which is not subject to weather events. Trucking and barging are also less energy efficient transport modes than pipelines.

Environmental Soundness. Any alternative shown to be environmentally sound should show an improvement or at least a status quo in environmental compliance and risk over time. No Action itself can be considered environmentally sound today since there are no major problems with the current system. However, due to continuously increasing frequencies of barge, truck, and ship activity involving more transfers, No Action becomes less environmentally sound over time. No Action would require more transfers from one mode of transport to another (i.e., to trucks and barges), when accidents are more likely to occur. The oil spill risk analysis in this EIS demonstrates that No Action would have a greater frequency of spillage than the proposed pipeline and a greater risk of injury and fatalities to the public. Therefore, based on accidents, death, and spill frequency, No Action would not meet the need for an environmentally sound alternative as well as the proposed pipeline. The major factor is increased truck accident potential which dominates the spill risk analysis in terms of frequency and human health risk. The proposal would also degrade in risk over time but to a lesser degree (see Section 3.18, Health and Safety).

The pipeline puts new resources at risk which are not now at risk. This includes rivers, the Cascades, agricultural lands, aquifers and wetlands. Without the pipeline, Puget Sound and the Columbia and Snake Rivers are continually exposed to risks from barge transport. Aside from quantified spill risk frequencies and volumes for all alternatives, this fact is difficult to quantify, and this EIS does not attempt to evaluate the value of the resources at risk. It is difficult to conclude that a quantifiable reduction in risk to existing resources (from barging and trucking) compared to a lower but new risk to new resources (from the pipeline) is more or less environmentally sound.

Meeting Long-Range Transportation Needs. The multiple mode delivery issues with No Action are made worse by growth in demand from shippers resulting in more and more trucks, barges, tankers, Puget Sound barges, and trucks at refineries. The longer the range that one evaluates, the less effective No Action is in meeting long-range transportation needs of shippers. Both No Action and the proposal would meet long-range transportation needs, although the proposal would do so more efficiently and reliably. This efficiency would be the result of fewer transfers from one mode of operation to another. The proposed pipeline would avoid the need to make a least two transfers of product from the existing pipeline to tanker trucks and then to tanks. The proposed pipeline would also be more energy efficient in moving product. A study conducted by the RAND Corporation determined that, on average, water carriers consume about 500 BTUs of energy per ton-mile, rail consumes 750 BTUs per ton-mile, and trucks consume 2,400 BTUs per ton-mile (USDOT 1994). Looked at in another way, Ainland water transport requires 3.15 gallons of fuel per 1,000 ton-miles of freight, rail freight requires 4.21 gallons (33 percent more than barges), and truck freight requires 8.33 gallons (164 percent more than barges).

Summary. Thus, the No Action Alternative is less cost-effective than the proposal, somewhat less environmentally sound, is not as efficient as the proposal, and will only meet long-range needs by expanding truck activities across Snoqualmie and Stevens Passes, and barge operation along the coast, in Puget Sound, and in the Columbia River. No Action is evaluated relative to the proposed pipeline to meet NEPA and SEPA compliance requirements.

2.4.2 Description of No Action

The No Action Alternative would keep the petroleum product delivery system at a status quo, which means that the existing pipeline system would remain and more barges and more trucks would be needed to handle future demand from the northwest refineries. Shippers desiring to use the OPL pipeline would continue to be prorated and would have to seek other means to transport product. This situation has been occurring and continues to occur at this time. Tidewater Barge Lines, Inc., an opponent of the project, agrees with this prediction and has been ordering and building larger barges to plan for this growth. An oil industry expert hired by Tidewater has confirmed that, in his opinion, growth in demand for transport will range from 1 to 2 percent per year (Johnson and Dickins pers. comm.). The existing barging and trucking activities that would be eliminated by the proposal would, instead, continue operation under No Action. This includes terminal operations in Clarkston and Umatilla, Tidewater operations up the Columbia and Snake Rivers, and barge operations on Puget Sound in the Strait of Juan de Fuca and along the coast.

Because the existing pipeline system would remain with or without the project, it is a Aconstant@ and the difference between No Action and the proposal can be described in terms of a new line and terminal versus barging/trucking. For this reason, impacts of the existing line itself are not discussed in detail in this EIS with or without the project. They are the same in either case.

Under the No Action Alternative, current modes of product transport would continue and would increase in volume. These modes -- pipeline, trucking, shipping and barge activities in Puget Sound, barging up the Columbia River, and other pipelines serving Washington -- are discussed below.

2.4.2.1 Seattle/Portland (Existing) Pipeline

Without the proposed pipeline, OPL would continue to operate its existing pipeline system at its current at-capacity levels, and at rates that provide economic returns under tariffs approved by the Federal Energy Regulatory Commission (FERC) and the Washington Utilities and Transportation Commission (WUTC). Refined petroleum products from the refineries in northwestern Washington that are destined for central and eastern Washington would continue to be transported through the existing line and via other means.

The existing pipeline begins as a 40.6 cm (16-inch) diameter line from refineries in Whatcom County and is joined by another pipeline of the same diameter that extends easterly from refineries near Anacortes in Skagit County. These two pipelines join at the Allen Station west of Burlington, and from this point a 40.6 cm (16-inch) and a 50.8 cm (20-inch) pipeline parallel each other to the Renton Station. At Renton, these pipelines are connected to a 30.5 cm (12-inch) pipeline that serves the Sea-Tac International Airport, a 30.5 cm (12-inch) line that serves the petroleum product terminals on Harbor Island in Seattle, and a 35.6 cm (14-inch) line that extends to Vancouver/Portland. This pipeline serves western Washington/Oregon markets including Sea-Tac International Airport, as well as providing the first leg in the current system for transporting petroleum products to central and eastern Washington.

Because of the lack of capacity of the existing OPL pipeline system and laws regarding common carriers, OPL has had to place restrictions on its existing pipeline system by prorating capacity among shippers. The ability to serve the airlines at Sea-Tac and Portland International Airports has been affected. The existing OPL pipeline is the only means for transporting jet fuel to the Sea-Tac International Airport. Air travel is anticipated to continue to increase (as evidenced by the need for a third runway at Sea-Tac International Airport). Proration increases costs for airlines in all cities because product must be acquired via more expensive means.

The product would continue to be transported to central and eastern Washington from northwestern Washington refineries by one of the following methods:

(1) From OPL's existing pipeline to the south Puget Sound area and from the northwest refineries directly, where products are transferred to tanker trucks for transport to central and eastern Washington using highways (I-90 and U.S. Highway 2, respectively) across the Cascade Mountains.

(2) OPL's existing pipeline to Vancouver/Portland, where products are transferred onto river barges for transport up the Columbia and Snake Rivers to Pasco, Umatilla, and Clarkston.

(3) Ocean-going barge or tanker ship from north Puget Sound, to Harbor Island, or through the Strait of Juan de Fuca, south along the Pacific Ocean coast of Washington to the Columbia River, then east up the Columbia River to Vancouver/Portland, where products are transferred onto river barges for transport up the Columbia River (this occurs during prorationing periods).

(4) Occasional transport of product from California to Portland where it is transferred to Tidewater barges serving markets up the Columbia River.

2.4.2.2 Increased Trucking to Western, Central, and Eastern Washington Customers

Under the No Action Alternative, increased trucking of product would continue in order to respond to the increased demands for petroleum products in western, central, and eastern Washington. OPL anticipates that trucking across the Cascades (via Stevens Pass and Snoqualmie Pass) would increase from 65 tanker trucks per day, to 71 trucks in 1999, 80 trucks in 2004, 90 trucks in 2009, 101 trucks in 2014, and an average of 112 trucks per day in 2019 (Table 2-10). This rate of increase would be expected to continue into the future. This growth can be roughly calculated showing a 1.5 percent annual increase to 50,000 bbls heading east. This increase is approximately at 31,500 gallons per day each year and would require four to five trucks if all was carried by truck. OPL estimates that less than half of this per day growth would travel via truck (two trucks per day), and the balance would travel by barge. Conversations with the four Puget Sound refinery managers have confirmed that trucking activity at the refineries also increases during proration periods. A Texaco marketing manager stated that they haul product from Harbor Island to Tumwater by truck as well (Stanley pers. comm.).

Compared to the 30-year planning period of the proposed pipeline, at this projected rate, truck traffic would rise from an average of 65 trucks per day in 1996 to an average of 128 trucks per day in 2026. As trucks (and barges) carried a proportionately greater and greater share of the product, transportation cost of that product would rise. The average number of trucks per day across the Cascades through Stevens and Snoqualmie Passes would eventually increase to the point that another mode of transport may be proposed again.

Table 2-10. Central and Eastern Washington Product Transport Demand 1996 - 2019 (average barrels per day)

Forecasted Demand	1996	1999	2004	2009	2014	2019
Truck	13,800	13,590	15,324	17,191	19,203	21,370
Barge	38,405	39,915	45,006	50,491	56,399	62,764
Subtotal	52,205	53,505	60,330	67,682	75,602	84,134
Yellowstone Pipeline	22,905	28,500	28,500	28,500	28,500	28,500
Chevron Pipeline	6,401	6,300	6,300	6,300	6,300	6,300
Subtotal	29,306	34,800	34,800	34,800	34,800	34,800
Total	81,511	88,305	95,130	102,482	110,402	118,935

Conversions:
1 barrel = 42 gallons
1 tanker truck = 8,000 gallons or 190.5 barrels per load
1 large bulk barge = 2,730,000 gallons or 65,000 barrels per load

Source: Based on information provided by Dames & Moore for OPL=s Application for Site Certification.

2.4.2.3 Increased Barging up the Columbia River

Before 1997, a combination of three large and small barges transported petroleum products from Vancouver/Portland to Pasco via Tidewater Barge Lines, Inc.. These barges were partially loaded, so there was capacity to increase the volume of product transported without increasing the number of trips. However, a fourth barge had been planned to be added in 1997.

Under the No Action Alternative, the total barge traffic up the Columbia River alone is projected to increase from 292 trips annually (24 trips per month) in 1999, to 346 trips (29 per month) in 2014, and 423 barge trips annually (35 per month) and an average of 62,764 bbls per day in 2019. A large liquid bulk barge transports up to 65,000 bbls of product per trip and a small barge transports about 30,000 bbls of product per trip. As large barges are added to the fleet, the number of trips may be reduced. This would increase the efficiency of barge shipments but remain less efficient than a pipeline. Fewer, larger barges would reduce the frequency of collision and increase the maximum potential spill volume.

2.4.2.4 Increased Barging Elsewhere

Refinery managers have stated that some of their barge and tanker activity from the northwest refineries which is occasioned by insufficient capacity of the OPL line also enters the Columbia River to Portland (Stanley pers. comm.). Without the project, the four northwest refineries would continue to haul product by barge and tanker from the refineries to Harbor Island and to Portland. Such hauling would all but stop with the project. Texaco, for example, had 58 shipments in 1996: 31 shipments from Marche Point totaling 988,848 bbls to Portland and 27 shipments from Marche Point totaling 535,499 bbls to Harbor Island (Stanley pers. comm.). This is 4.8 shipments per month averaging 28,300 bbls per shipment on Puget Sound and along the coast. Texaco, then, ships three barges per month up the Columbia to Portland in addition to the Tidewater Barge Lines, Inc. shipments. Another refinery reported barge shipments of 120,000 bbls to 240,000 bbls per month as a result of proration. Based on an average of 50,000 bbls per barge, this would be 2.5 to 5 barges per month. Other refineries ship during existing proration events as well, perhaps totaling 12 to 20 barge shipments per month on Puget Sound.

One barge haul issue, the Chevron product from California, is uncertain. In a letter dated October 10, 1997, Tidewater Barge Lines, Inc. stated they would discontinue all petroleum shipment operations if the pipeline were built. Because Tidewater is the only petroleum carrier on the Columbia River, it is probable that the proposal would eliminate all petroleum product barge traffic on the Columbia River above Bonneville Dam, and most, if not all, such traffic below Bonneville Dam. This would eliminate the current barging system which carries Chevron products from California up the Columbia to the Chevron terminal or to Tidewater terminals. It is unknown how the product from the Richmond, California market would continue to reach its eastern Washington destination. Options include rail, truck to Boise, or using the new pipeline via barging from California to Marche Point or Cherry Point. Under No Action, Chevron would continue to ship an average of 3,000 bbls per day to Portland.

Tidewater Barge Lines, Inc.=s storage terminals in Clarkston and Umatilla would continue to operate under No Action, including trucking and transfer of product to and from those locations. Thus, the project would result in one oil terminal (Kittitas) while No Action would maintain two (Umatilla and Clarkston).

2.4.2.5 Increased Ocean Barging from Northwest Refineries

Increased ocean barging of refined petroleum products from the northwest refineries or from California would continue to occur under the No Action Alternative, with subsequent transfer to the river barges in Vancouver/Portland for transport to Pasco or via other means. The ASC estimates that increases in ocean barging would total 5,800 bbls per day in 1999; 12,085 bbls per day in 2004; 19,437 bbls per day in 2009; 27,357 bbls per day in 2014; and 35,889 bbls per day in 2019 (OPL 1998). These increases are in addition to the refined product currently (1995) carried up the Columbia River by Tidewater Barge Lines, Inc. (see discussion of Texaco=s ocean barging, above). These increases assume that all the growth in demand in central and eastern Washington is met by deliveries from western Washington.

2.4.2.6 Effect on Product Costs

As shown in Table 2-9, existing transport of petroleum products to central and eastern Washington by pipeline and river barge to Pasco is estimated to cost shippers $2.05 per barrel (5 cents per gallon). Cost for transport by ocean barging and then river barging is estimated to cost $2.90 per barrel (7 cents per gallon). The proposal would deliver to Pasco for an assumed tariff of $1.50 (3.6 cents per gallon) or approximately 3 cents per gallon less than now. Based on initial throughput, this represents an annual savings to shippers of $12 million per year. The extra costs of transport of No Action may be borne by consumers or, if market prices did not allow that, by the shipping companies and/or their stockholders.

To determine the comparative costs for truck transport to intermediate locations, such as to Kittitas, two trucking companies were contacted. One stated that it cost about $0.033 per gallon to transport petroleum products 100 miles, or about $1.26 per barrel. Another trucking company (Torkelson pers. comm.) said it cost about $1.39 per barrel for that distance. Seattle is about 187 km (116 miles) from Kittitas, so it may cost about $1.46 per barrel to transport petroleum products there, prorating the $1.26 per barrel rate. If transport occurs over Snoqualmie Pass, a fee would also be levied for pipeline transport from the refineries to Harbor Island, where the product would most likely be loaded. It costs about $0.44 per barrel to transport product from the refineries to Portland, and one can assume it would cost about one-third of this for shipment to Harbor Island (located about one-third the distance to Portland), or about $0.15 per barrel. In addition, there would be a $0.25 per barrel transfer/storage fee at Harbor Island if used as a storage site. Thus, the total estimated cost for piping/trucking product from refineries to Kittitas is about $1.46 per barrel without other costs attached, and close to $1.90 per barrel including storage and transportation to Harbor Island.

In contrast, total transport costs to Pasco for the new pipeline were calculated by OPL to be $1.50 per barrel. Transport costs to Kittitas, about half the distance, would be less, perhaps half as much. It is not known whether OPL would charge a transfer fee at Kittitas. Without calculating how much less, and with or without a transfer fee, it can be seen that product delivery to Kittitas via the pipeline (less than $1.50 per barrel) would be less than trucking.

This EIS does not evaluate the petroleum product supply - demand status for Washington, nor does it evaluate retail diesel or gasoline pump costs with or without the project. It is apparent from costs at the pump and confirmed by various refinery managers, that competition drives gasoline prices more than transport costs. In fact, with wholesale gasoline at 70 cents to 80 cents per gallon, and gas selling for less in the Tri-Cities than in Seattle, transportation costs do not appear to determine pump price, while competition does. Gasoline costs less in Richland, further from the refinery, than in Seattle, due to competition. Without the project, shipping costs would escalate as greater shares of product were shipped by barge and truck. The level of competition would remain. With the project, if Tidewater Barge Lines, Inc. ceases operation, and no one else continues it, Chevron=s relatively minor role (3,000 bbls per day) in competition may be reduced. No other effects on competition have been identified. No retail price effects have been evaluated for diesel or jet fuel.

2.4.2.7 Effect on Other Pipelines

There have been scoping comments that the project is not needed because other pipelines could provide all the product that central and eastern Washington needs. Another point raised by commentors is that, although shippers clearly prefer OPL to the Yellowstone or Chevron pipelines (based on the 20 percent oversubscription of OPL), conditions will be changing and the other lines will be providing much more product in the future. This prediction is incorrect and is discussed here.

Whether or not the Yellowstone or Chevron pipelines can meet future demands for product transportation in eastern and central Washington without OPL is not directly relevant to the project's Purpose and Need, which is to satisfy shippers' desire to carry northwest refinery products to central and eastern Washington. These other two lines are not alternatives to the proposal. They cannot satisfy that need. Their potential to provide additional petroleum supplies is discussed here because the other pipelines have been mentioned and suggested as alternatives by others and because they would play a role in No Action.

Yellowstone Pipeline. The Yellowstone pipeline is a primary carrier of gasoline, commercial jet fuel, and military jet fuel to eastern Washington in the Spokane and Moses Lake areas from refineries in Billings, Montana. It would continue to serve existing Washington markets with or without the project. This discussion explains how it would operate under No Action.

The Yellowstone pipeline has a capacity of 60,000 bbls per day from Billings to Bozeman, Montana, and 56,000 bbls per day from there to eastern Washington. It transports products to the Conoco, Exxon, and Tosco terminals in Spokane and the Conoco terminal in Moses Lake. It also delivers jet fuel to Fairchild Air Force Base, Spokane International Airport, and Moses Lake Grant County Airport. Because of difficulties in transporting products from Billings to Bozeman, as a result of a recent need to truck product around the Flathead Indian Reservation, deliveries have had to be prorated during the high-use spring and summer months. (EAI 1995.) Some customers, such as Fairchild Air Force Base, received their Billings-based product by truck or rail to their destination. As a result, delivery of transported product to eastern Washington via the Yellowstone pipeline alone only averaged a total of 22,905 bbls per day in 1996 (Table 2-11). Other transportation methods were provided east of Missoula (truck and rail) to satisfy demands and all customers received their product.

The Yellowstone pipeline is 20.3 cm (8 inches) in diameter to Spokane and 15.2 cm (6 inches) to Moses Lake. At Spokane, the Yellowstone pipeline has a connection to the 20.3 cm (8-inch) Chevron pipeline from Pasco. Because the Yellowstone pipeline enters Washington from the east, it would not provide a means of transporting petroleum products from western Washington refineries to central and eastern Washington as requested by shippers. It is at some reliability and cost-effectiveness risk because it no longer serves Washington directly and is applying for permits for reroute and for continued operation. If it receives all permits and approval to keep operating, it will be able to maintain historical levels.

Table 2-11. Volume of Product Transported into Central and Eastern Washington by Pipeline, Truck, and Barge (Average Barrels per Day), 1987-1996

Year	Yellowstone Pipeline	Chevron Pipeline	Trucked	Barged	Total
1987	24,534	13,468	11,587	25,434	75,023
1988	26,895	16,458	11,587	18,891	73,831
1989	24,600	15,742	8,950	23,255	72,547
1990	29,183	13,361	9,213	23,199	74,956
1991	29,583	14,899	9,213	20,605	74,300
1992	28,083	12,300	13,500	24,056	77,939
1993	26,324	11,199	11,300	32,396	81,219
1994	27,879	9,702	8,200	36,904	82,685
1995	22,856	7,336	8,200	43,449	81,841
1996	22,905	6,401	13,800	38,405	81,511
Yearly Average	26,284	12,087	10,555	28,659	

Source: OPL 1998.

Note: Data may not include rail shipments used to make up for transport problems with YPL line.

A spokesperson for the Yellowstone pipeline (Thompson 1997) stated that shippers determine the amount of product transported by the Yellowstone line, not the Yellowstone Pipeline Company itself. Without a large increase in demand from shippers for some reason, the line would not expand significantly, and would only handle the routine regional growth above what it is currently handling (its share of the market). The Yellowstone line is not now oversubscribed and has no reason to expand. The Yellowstone Pipeline Company has no plans for expansion and would continue to operate under No Action as it does today (Rockwell 1997). It responds to the needs of shippers. This means that the shippers in eastern and central Washington who use the OPL system find it is less expensive and/or more reliable to ship using a combination of the OPL system and trucks and barges, even with proration, than to use the Yellowstone line. There is more excess demand (above capacity) for transport of product through the OPL line than through the Yellowstone line. Therefore, Yellowstone does not appear to offer an alternative means of transport of product other than to compete in part of the same market. It has no plans to carry the volumes proposed by OPL and, of course, it will not carry the product proposed by OPL.

Chevron Pipeline. The Chevron pipeline originates at refineries in Salt Lake City, Utah which refine crude oil from Canada, Utah, and Wyoming. The pipeline is a dual-line from Salt Lake City to Boise with a capacity of 36,000 bbls per day of gasoline in one line and 28,000 bbls per day of jet fuel in the other line. The gasoline line has been at capacity since the early 1990s and the second line only had 4,500 bbls per day of available capacity (i.e., it was 84 percent full to Boise). The pipeline has a capacity of 18,000 bbls per day for a single line from Boise to Pasco and 16,000 bbls per day on the 20.3 cm (8-inch) Chevron pipeline from Pasco to Spokane. Demand for products in the Salt Lake City and Boise areas has resulted in retraction of deliveries to Pasco. (EAI 1995) As a result, delivery of product to eastern Washington only averaged a total of 6,401 bbls per day in 1996 (Table 2-11). This occurred even when the Yellowstone line was having delivery problems to Washington, because demand in Boise/Pocatello has exceeded supplies.

According to a spokesperson at Chevron Pipeline Corporation (McKee pers. comm.), there is increased production potential in Salt Lake City as a result of increased crude supplies and increased refinery capacity, which will help proration problems between Salt Lake City and Boise and perhaps maintain 8,000 to 12,000 bbls per day west of Boise, some of which will reach Washington. This is an increase of current flow but less than historical flows. This will solve supply problems in Boise/Pocatello but have little effect on supplies in Washington. There are no plans by Chevron to increase this shipping capacity beyond this range. Therefore, the Chevron line will continue to operate at or near current levels with or without the Cross Cascade pipeline. Under No Action, the Chevron line would not replace the capacity of the proposed or existing OPL system.

Thus, the Chevron pipeline would not have the capacity to transport significant loads of additional product to eastern Washington. It also does not provide a means of transporting petroleum products from western Washington refineries to central and eastern Washington. Under No Action, the Chevron line would have no effect on future oil supplied to Washington, other than to attempt to maintain historical flows.

Effect on Shippers. Shippers have indicated and transportation cost studies (USDOT 1994) have shown that trucking is more expensive than barging, and both of those options would be more costly than transport of product by the proposed pipeline (see Sections 2.3.5, 2.4.2.6, and 2.6.1.3). Shippers have contracts to provide product to their wholesale customers at a fixed cost. If they cannot use the existing pipeline and barge system to transport product, because of over subscription of the pipeline (see Section 2.4.2.1) or a temporary closure of river transportation (as occurred with a 4-day closure during high flows in the Columbia River), they must truck product to the wholesaler. The increased costs for shipping by alternative modes of transportation are borne by the shipper.

However, shippers acknowledged that these increased costs are subsequently considered when contracts are renewed with wholesalers. Increased transport costs eventually are a factor considered in new contracts with wholesalers, in the increased cost of product, and ultimately these costs can be transferred to the retail consumer through increased prices for fuel. (Stanley pers. comm.) Thus, increased costs for transporting product to central and eastern Washington under the No Action Alternative via increased trucking would likely result in pressure to increase cost to all users of diesel, jet fuel, and gasoline.

Shippers did not consider the Yellowstone or Chevron pipelines to be viable alternatives to the proposed OPL pipeline because of the lack of capacity, the lack of available supply (see Section 2.4.2.7), or because of their desire to promote the sale of their own products rather than a competitor=s products (Stanley pers. comm., Eastlake pers. comm.). The Defense Logistics Agency, Defense Fuel Supply Center (DFSC) stated that it no longer used the Yellowstone pipeline to obtain jet fuel for Fairchild Air Force Base in Spokane because of YPL=s lost lease across the Flathead Indian Reservation (Broderick pers. comm.) and conversion to trucking around the reservation. In 1996, the DFSC was using about 35 million gallons of jet fuel annually and had shifted to trucking it from a government terminal in Manchester, WA (located south of Bremerton in western Washington) to assure a reliable source was available. The DFSC indicated it would benefit from, supported construction of, and would use the proposed OPL pipeline to obtain jet fuel if the fuel costs were the Alowest laid down cost.@ They also stated that the proposed pipeline would provide them additional options for delivery of fuel to other bases such as the Yakima Training Center (Broderick pers. comm.)

Thus, in summary, shippers supported the development of the proposed pipeline because of reduced costs, increased reliability, reduced risk and liability, and the projected increased demand for product in central and eastern Washington (see Section 2.4.2). Shippers have indicated that they have already agreed to ship petroleum products on the proposed pipeline, or have a desire to do so and support construction of the pipeline. (Eastlake pers. comm.)

A major wholesale customer in the Tri-Cities area (name withheld) and a user of the existing OPL pipeline has indicated that the benefits that would be experienced by shippers from the proposed OPL pipeline would also be experienced by the wholesalers. They are experiencing restrictions in delivery of petroleum products because of the over subscription of OPL=s existing line. This requires them to obtain additional product from elsewhere. They have also experienced interruptions in availability of product as a result of lock closures several years ago. They feel that the proposed pipeline would benefit them and all wholesalers because it would provide an additional option for obtaining product. The pipeline would increase the reliability of delivery of products to them because they would not have to rely only upon barging to meet their supply needs. It would also assist in keeping prices lower because it would create greater market competition. It would be more cost-effective and efficient because of reduced reliance upon multiple modes of transport (and the associated costs of transfers). As a result of the wholesaler obtaining more cost-competitive product, they are able to reduce their costs and pass those savings on to their retail customers. They also viewed the pipeline as being a safer transport option than the current system, decreasing the potential for environmental damage and liability for the parties involved in purchasing and shipping the products. They do not view the Yellowstone or Chevron pipelines as viable alternatives because of the lack of supply and the greater transportation and petroleum costs from those pipelines.

Summary. Notwithstanding scoping comments that the future will change the product supply picture in eastern Washington, owners of the two lines have confirmed that neither the Yellowstone nor the Chevron pipeline has expansion plans into Washington and neither has a need to expand capacity. Both spokespersons confirmed that their delivery capacity is determined by shippers= demand, that demand is not currently requiring an increase in capacity, and that the decisions of shippers as to which product is ordered, shipped, and sold is the driver affecting the need to expand or modify operations, not the plans of the pipeline companies themselves. In the case of Chevron, the supply is currently not there to meet the demand anyway, nor will it be after system expansion to Boise. Neither line has plans to meet the demands that would be satisfied by the OPL proposal and, of course, neither line could deliver northwest refinery products to meet the need.

The new Express Pipeline from Canada to the Rockies has been mentioned as a source for a major supply picture change. The spokesperson for the line, however (Murphy pers. comm.) said that 80 percent of its flow goes to the Rockies and Midwest with less than 20 percent (18,000 bbls per day) toward Salt Lake City. The spokesperson felt the line would have no effect on Washington supplies.

2.5 PROJECT SITING OPTIONS

This section discusses alternative pipeline alignment and siting options. Alternative projects that do not meet the need are discussed in Section 2.6.

As part of preparing the project proposal and attempting to avoid or minimize impacts, OPL has evaluated options for approaching and crossing the Columbia River, micrositing along the other segments of the pipeline (including around wetlands), locating the terminal, and locating the pump stations. These options and their relative evaluations are provided below.

2.5.1 Columbia River Approach Options

OPL originally selected a pipeline corridor across the U.S. Army Department of Defense Yakima Training Center located south of I-90 in Kittitas and Yakima Counties in central Washington. The Department of Defense raised early concerns about potential conflicts between the pipeline and the potential movement and training activities of heavy tracked armored vehicles (up to 72 tons each) across the line. As a result, OPL investigated the following options in that area (Figure 2-11):

- through the Yakima Training Center (YTC);
- inside the property/fence line of the YTC, closer to I-90; and
- north of I-90 through Ginkgo Petrified Forest State Park.

OPL now prefers the route north of I-90 through Gingko State Park, because the Department of the Army has indicated that the pipeline would be in conflict with training activities and did not desire to provide an easement to OPL. Impacts of the proposed route and the other two options are considered in this EIS.

2.5.2 Columbia River Crossing Options

In its analysis of alternatives, OPL initially evaluated nine options (see Table 2-12) for crossing the Columbia River (OPL 1998). OPL determined that the following options (Figure 2-11) are potentially feasible based upon constructability, cost, and environmental impacts:

- dredging north of the I-90 Bridge ($10.0 million);
- crossing the I-90 Bridge ($6.9 million);
- horizontal directional drilling (HDD) downstream (south) of Wanapum Dam ($7.8 million);
- crossing the Burlington Northern Beverly Railroad Bridge ($7.6 million); and
- crossing on Wanapum Dam ($6.9 million).

Table 2-12. Initial Columbia River Crossing Options Evaluated

Location	Geotechnical Feasibility	Environmental Impacts[1]	Estimated Cost[2]
Drilling north of I-90 Bridge	unknown	need large cleared area for drilling base	$8.5 million
Dredging north of I-90 Bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$10.0 million
Crossing on I-90 Bridge[1]	structurally feasible	none	$6.9
Drilling south of I-90 Bridge	unknown	no place for drilling base	>$8.0 million
Dredging south of I-90 Bridge	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$10.0 million
Crossing on Wanapum Dam[1]	structurally feasible	none	$6.9 million
Drilling south of Wanapum Dam	gravel - feasible	need large cleared area for drilling base	$7.8 million
Dredging south of Wanapum Dam	gravel - feasible	need to minimize impacts to fish habitat and shorelines	$7.0 million
Crossing on Beverly Railroad Bridge[1]	structurally feasible	none	$7.6 million

[1] Structure owners have not granted permission to use their structure.
[2] All costs are based on routes beginning at Stevens Road east of Kittitas Terminal and ending at the Beverly-Burke Pump Station.

Source: OPL 1998.

OPL's preference is to perform directional drilling downstream from Wanapum Dam. The geotechnical investigation of the proposed Columbia River crossing site indicated that there was a moderate level of risk associated with attempting an HDD installation. While the site conditions are not optimum for an HDD installation, OPL believes the technology exists to complete the installation with a low probability of fracturing out. OPL=s decision to propose the HDD installation is based on its belief that an HDD installation at this site would result in the most secure, lowest risk operation. Various regulatory agencies have expressed general concern about the potential for impacts to the river from a small leak that goes undetected for a long period of time. OPL believes its existing pipeline crossing under the Columbia River near Vancouver, Washington, which has been in place without incident for over 30 years, provides a practical demonstration that a buried pipeline crossing that is properly designed, installed, and maintained is environmentally sound. Geological conditions below the Columbia River are different at Vancouver than they are at Wanapum.

The crossing of the I-90 Bridge, the Beverly Railroad Bridge, or Wanapum Dam depends on OPL=s success in obtaining authorization from the Washington State Department of Transportation, the Washington Parks and Recreation Commission, or Grant County PUD. None of the owners have stated a position in writing. It is OPL=s understanding that the use of any of these structures is a real property issue that is separate from the federal and state permitting processes applicable to the project.

OPL has entered discussions with Washington State Department of Transportation (WSDOT) about the possibility of using the I-90 Bridge; to date WSDOT has not made a decision about the acceptability of using the bridge. This would be the least expensive of the alternatives and would likely have the fewest environmental impacts.

Use of the Beverly Railroad Bridge would require obtaining permission from Washington State Parks and Burlington Northern Railroad, who is considering reactivating the bridge for railroad traffic. The potential for future railroad use, the greater length of exposed pipeline, and the unknown but questionable structural integrity of the bridge all reduce the desirability of this option. Without proper rehabilitation of the bridge and abutments, this route might also pose an operational risk of pipeline rupture above the river resulting from damage to the bridge by seismic shaking.

OPL has also applied to Grant County Public Utility District for authorization to place the pipeline along the upper portion of Wanapum Dam. However, no decision has been made to date as to whether such authorization would be approved.

OPL is continuing to pursue these options, but currently views them as unavailable alternatives. In terms of cost, the HDD alternative below Wanapum Dam does not differ significantly from most of the other potential alternatives. Overall impacts of these three alternatives are similar. All involve an exposed crossing, trenching along the Columbia, and similar habitat. All require crossing through Ginkgo Petrified Forest State Park or the Yakima Training Center. Crossing under the Columbia, with its slightly higher potential for undetected leaks, may be contrasted to an exposed bridge or dam crossing, with its slightly higher potential for damage.

A wet trench dredged crossing provides a conventional construction technique; however, it would disturb and release more sediment into the river than the proposal, create some construction access problems on the narrow shoreline east of the river, and would be very difficult logistically with no way to bring needed barges and equipment by water.

2.5.3 Pipeline Micrositing Options

AMicrositing@ refers to specific alignment changes made along the proposed pipeline=s centerline. The original ASC map atlas prepared in February 1996 presented a proposed centerline based on known issues at that time. Since then, a number of route improvements within the proposed corridor were made based upon additional field studies and after consultations with federal, state, and local agencies and property owners. Micrositing of the pipeline will continue to occur to avoid or minimize impacts, and after further consultation with agencies. The criteria used for evaluating optional centerline locations included:

- Preference for use of existing cleared ROW, including transmission line corridors, trails, and roadways.

- Avoidance of high-quality wetlands or wildlife habitat.

- # Minimizing impacts at stream crossings by the use of existing bridges.

- # Minimizing impacts at stream or river crossings by using the narrowest feasible crossing points.

- # Avoidance of land use impacts, such as existing structures, irrigated crop lands, gardens, orchards, and golf course fairways.

- # Land owner preferences as to line location.

A discussion of the micrositing of the pipeline is provided in Appendix E. One alternative route segment is considered here in detail. Most others are much shorter. This entailed using a segment of the John Wayne Trail between Alice Creek and the Snoqualmie Tunnel versus using Tinkham Road. This example illustrates the types of balances faced in micrositing the pipeline.

The Tinkham Road option uses more miles of U.S. Forest Service land. Seven streams and one wetland along the Tinkham Road route would have to be trenched alongside the road because the bridges or other road crossings are not suitable for the pipeline. Of these seven streams, Rock and Harris Creeks have little or no fish habitat at the crossing locations, but are near the floodplain of the South Fork Snoqualmie River where fine sediments are more prevalent. Carter and Hansen Creeks are minor fish producers in the reaches of the proposed crossings, but are also in the floodplain, and Hansen Creek has somewhat unstable banks. Humpback Creek is a significant trout producer. Olallie Creek, Crossing 82 (see Appendix D, Table D-1, and Section 3.7.1.3) has trout some distance downstream, but nothing significant at the crossing. The one wetland is associated with Carter Creek.

The John Wayne Trail route is longer, and use of that section of the trail requires placing the pipe on the bridge over Hansen Creek. OPL believed construction and maintenance crews would be at greater safety risk during work on the bridge and there is little assurance that, during the life of the pipeline, the Hansen Creek Bridge would never be vulnerable to a flood such as washed out the Hall Creek Bridge. The culvert system at Olallie Creek is another concern. The creek is diverted through a long culvert at that location, and the railtrail has washed out in the past when a debris flow blocked the culvert. Because of the washout, the trail is significantly narrower and is in a dip at that location. To have room for the pipeline, the downslope side would have to be built up, probably using pilings to hold the fill in place. Another debris flow might again block the culvert, causing the creek to overflow the trail and wash it out again. Protecting the pipeline against such forces is not certain. Considering all these factors, OPL believed that the Tinkham Road route was the better choice for the proposed project (OPL 1998). Recent evaluations of Forest Plan consistency versus this alternative may create a problem for the Tinkham Road option (see Land Use).

2.5.4 Terminal Site Options

Optional sites were evaluated for locating the terminal facility, generally near Ellensburg in the I-90 corridor (Dames & Moore 1997). Three sites were identified by ROW personnel and a third site at the Ellensburg Airport was identified by Kittitas County commissioners. As shown in Table 2-13, the four sites evaluated were:

- A 10.9 ha (27-acre) tract adjacent to the Kittitas exit on I-90.
- A tract near the intersection of State Route 10 and State Route 97.
- A site near Elk Heights.
- County-owned industrially-zoned property at the Ellensburg Airport.

The criteria used for evaluating alternative sites for the Kittitas Terminal were:

- Site must be located near the middle of central Washington to serve as an efficient distribution point for central Washington.

- Site must be located in close proximity to major east-west and north-south highways to provide efficient distribution to central Washington.

- In order to avoid maintaining excessive amounts of back pressure on the pipeline, the site needed to be located in an area of gradual elevation change and far enough east or west of areas such as Elk Heights where there is a rapid elevation gain.

- Adequate site size.

- Availability of electric power at the site.

- Compatible land uses adjacent to the site and along connecting corridors between the site and major highways.

- Availability of existing adequate transportation infrastructure from major highways to the site for tanker truck traffic.

- Ability to purchase the site for the facility and to secure proper zoning.

The Ellensburg Airport site was eliminated from consideration based on the difficult truck access to the regional system, the need to build new roads, safety considerations related to winter driving conditions, the high back pressure in the system that would be caused by the location near the mountains, and the presence of wetlands on the site.

The Elk Heights site was eliminated based on construction costs due to the need to construct 11.3 km (7 miles) of new electrical supply lines, the need to build an electrical substation, and the need to construct major revisions to existing ramps to the interstate system.

Table 2-13. Evaluation of Terminal Site Options

Criteria	Alternative Sites: Kittitas*	SR 10/SR 97	Ellensburg Airport	Elk Heights
System Hydraulic Impact	none	high back pressure	high back pressure	none
Electric Power Availability	0.75 mile to suitable substation	0.75 mile to suitable substation	2-3 miles to suitable substation	7 miles to suitable substation
	need to build feeder	need substation and feeder upgrades	need substation and feeder upgrades	need to build feeder and substation
	two viable suppliers	one viable supplier	two viable suppliers	one viable supplier
Land Uses at Site and Along Transportation Corridor	interstate highway	state highway	residential	rural residential
	highway commercial and agricultural uses	agricultural uses	residential and agricultural uses	residential and agricultural uses
Transportation Infrastructure	adjacent to interstate highway	adjacent to state highway	adjacent to county road	adjacent to interstate highway
	very easy access to regional system	easy access to regional system	difficult access to regional system	very easy access to regional system
	may need minor revision of ramps	need to build signals or acceleration lane	need to build road section and upgrade intersection	need major revision of ramps
	good all-weather access	good all-weather access	dangerous grade for winter driving	good all-weather access
	moderate volume use for residential and agricultural access	moderate volume use for residential and agricultural access	high volume use for residential and agricultural access	low volume use for residential and agricultural access
Property Ownership	purchase from private landowner	purchase from private landowner	lease from public landowner	purchase from private landowner
Wetlands or Sensitive Areas Onsite	none	none	yes	not evaluated

* Selected as preferred site.

Source: OPL 1998.

The Kittitas site and the State Route 10/State Route 97 site were comparable in terms of access to the regional transportation system and access to power. The State Route 10/State Route 97 site was viewed as less desirable due to the high back pressure that would be created in the system based on its location near the mountains and the construction costs to build an electrical substation.

The Kittitas Terminal site was selected as the preferred site.

2.5.5 Pump Station Site Options

The proposed project would have six pump stations, including one at the Kittitas Terminal. Pump stations were generally located based on the needed hydraulics for efficient operation of the pipeline. The criteria for evaluating alternative pump station locations were:

- Appropriate hydraulic location.
- Adequate land area for pump station.
- Adequate existing electrical power supply, or proximity of existing electrical supply.
- Year-round access to site.
- Avoidance of wetlands and other environmentally sensitive areas.

2.5.5.1 Thrasher Pump Station

The Thrasher Pump Station is the origin of the pipeline. Two alternative sites, one at OPL's existing Woodinville Pump Station and a second site on 46th Avenue North, north of 212th Street NE in Woodinville (Thrashers Corner), were considered. The Thrashers Corner site was located directly adjacent to a BPA transmission line corridor, a corridor desired for routing of the pipeline.

The Woodinville Pump Station site is surrounded by residential development and cannot be enlarged. The site was too small to accommodate both the existing and proposed pump stations. Also, the site is approximately 3.2 to 4.8 km (2 to 3 miles) from the BPA transmission line corridor. This additional mileage would have added approximately $1 - 1.5 million in construction costs.

The Thrasher Pump Station site was selected as the preferred pump station location based on site size and immediate proximity to the proposed pipeline corridor. This site also satisfied the criteria of avoiding environmentally sensitive areas.

2.5.5.2 North Bend Pump Station

Six alternative sites were considered for the location of the North Bend Pump Station. The pipeline in this area was proposed to be located on the Cedar Falls Trail. Three sites along the trail were evaluated in or near North Bend, one on the north side of the trail at SE 120th, one directly to the south on the south side of the trail, and a third location near I-90. A fourth location was reviewed further to the east near Edgewick Road. The sites near I-90 and Edgewick Road were eliminated due to the lack of electrical power. Two additional sites approximately 3.2 km (2 miles) further to the east were considered. Neither site had an adequate power supply, and one site would not be accessible during the winter months.

The two sites near SE 120th were viewed to be equal in terms of power supply, access, and site size. Neither site has wetlands nor significant wildlife habitat. The southern site was selected based on the landowner's willingness to grant an easement for both the pipeline and the pump station.

2.5.5.3 Stampede Pass Pump Station

The Stampede Pass Pump Station was located at the intersection of Stampede Pass Road and the John Wayne Trail. The proposed pipeline alignment for this segment was within the trail. There were no alternative sites in this vicinity with power, access, or adequate land area.

2.5.5.4 Beverly-Burke Pump Station

After crossing the Columbia River near Vantage, the proposed pipeline corridor travels east along Beverly Burke Road. There was only one site identified in this area that was of suitable size, with adequate power and access, and available for sale. The site is directly adjacent to Beverly Burke Road approximately 6.4 km (4 miles) east of the Columbia River.

2.5.5.5 Othello Pump Station

The Othello Pump Station site was located on Mound Road just to the north of State Route 246 near the boundary between Adams and Franklin County. The site was on the proposed pipeline corridor. No alternative sites were found in this area with adequate land size, access, and power, and available for sale.

2.6 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

As described earlier in this chapter, this EIS evaluates the potential impacts of two alternatives: the Cross Cascade pipeline proposal and No Action. In the process of developing the alternatives, other options have been evaluated and eliminated from further detailed study in this EIS. This includes two tiers of alternatives:

- Project Alternatives
- Project Corridor Alternatives

Alternatives to the project that were determined not to meet the need are discussed below under AProject Alternatives@ and include the following:

- Rail Transport
- Demand Management
- New North-South Pipeline
- Other Means of Transport

Alternative project corridors considered but eliminated from detailed study are potential west-east routes for placing the OPL pipeline (see AProject Corridor Alternatives@ later in this section). These alternative corridors were evaluated relative to the proposed pipeline route and included:

- two Snoqualmie Pass Routes
- Yakima Valley Route
- Stampede Pass Route
- two Stevens Pass Routes

The two tiers of alternatives were evaluated with increasingly detailed and stringent evaluation criteria that were commensurate with the level of data available at each stage in the screening process. Initially, the project alternatives were generally evaluated based upon the criteria of cost-effectiveness, efficiency (of construction, operation, and transport), and environmental soundness (or level of impacts). Cost-effectiveness was the dominant screening criterion for projects. Those that cost more than No Action would not be used by shippers and were infeasible and not cost-effective.

Once the project alternatives evaluation was completed, and a west-east pipeline was selected as the alternative best meeting the Purpose and Need, alternative pipeline corridors were evaluated with more criteria and a greater specificity of information. Six criteria were used to evaluate seven corridors (including the proposed route). The similarity in characteristics of pipelines, despite their locations in different sites, allowed a more detailed point-by-point evaluation. Thus, the same cost-effective needs screening that was done for the project alternatives (i.e., cost of transport per barrel no more than No Action) was not applied to the corridor alternatives. It is assumed that any pipeline corridor alternative is cost-effective compared to No Action.

2.6.1 Project Alternatives

2.6.1.1 Railroad Transport from Woodinville or Portland to Pasco

Rail transport is not cost-effective for shipping petroleum products to central and eastern Washington, which probably explains why no one has proposed it. There are several existing rail lines between northwestern Washington and central and eastern Washington, providing alternative routes for transporting product. However, this form of transport is not being used by shippers because it is not cost-effective compared to trucking or barging of petroleum products from either Woodinville or Portland. The estimated cost of rail product transport from the Seattle area to Pasco is $3.45 per bbl (see Table 2-9) (OPL 1998) assuming there are facilities and terminals to handle rail offloading at Pasco terminals, which there are not.

There are no proposals to ship product from the refineries by rail. Rail operation, if proposed, would require loading operations at points unconstrained by delivery capacity such as in Snohomish County, and would require offloading facilities at the Northwest Terminalling Facility. Reliable rail service could be disrupted by landslides or derailment of other trains using the same track.

Because it is too expensive, would not be used, has no petroleum handling infrastructure, and is considered remote and speculative because no one is proposing it, rail operation does not meet the Purpose and Need and is not evaluated in detail as an alternative.

2.6.1.2 Demand Management

Product Conservation. Federal requirements establish the fuel efficiency requirements for vehicle fleets manufactured by major auto makers. These requirements, plus the public demand for fuel-efficient cars, have resulted in fuel savings since the 1970s oil crisis. However, overall petroleum product consumption continues to increase and more crude oil is imported today than before the oil crisis. In addition, to meet the demands of airlines and operating/cost efficiency, aircraft have become more fuel efficient. Although many gains have been made in conserving petroleum products in the last 25 years, demand has increased.

Although more successes in this area are possible, each additional unit of conservation costs incrementally more to implement. It is also difficult to encourage switching to mass transit, car pooling, or other forms of transportation in rural areas like central and eastern Washington because of the costs of such programs in relatively unpopulated areas. Thus, the opportunity to meet substantial additional conservation goals would be minimal and would be outside of the control of OPL. This would also have no effect on diesel consumption from agricultural activities and trucking. The proposal would provide products to consumers after the effects of conservation measures have been felt.

Fuel Switching to Natural Gas. Many of the petroleum products now transported to central and eastern Washington, and that would be transported by the proposed pipeline, are used to fuel personal vehicles, farm equipment, commercial tractor trailers, aircraft, and other vehicles. Switching all or a substantial number of this motorized transport to use natural gas might not be technically feasible, would be very costly, would require a number of individuals and businesses to change the means of obtaining fuel and operating their equipment, and would not be within the capabilities of OPL.

The main residential energy modes used for heating, cooking, water heaters, dryers, etc., are electricity and natural gas. Switching from home heating oil to natural gas would have little effect on OPL. Such switching may also increase demand for gas pipelines. The alternative of demand management does not meet the Purpose and Need and is not evaluated in detail as an alternative.

2.6.1.3 New North-South Pipeline System Alternatives

The north-south alignment is discussed here as a project alternative instead of a corridor alternative because it does not achieve the goals of the project in the same way as the proposal and is more than just an alternative route. It is an alternative to the project. Instead of another means to carry products directly to central and eastern Washington, like the alternative pipeline corridors discussed later in this chapter, a north-south line is more similar to the current situation: it encompasses transfers at Portland, barging up the Columbia River, trucking on Snoqualmie and Stevens Passes, and it expands the north-south transmission capacity. New north-south alternatives eliminate proration problems, but do not offer shippers lower cost deliveries to central and eastern Washington.

Before evaluating the north-south alignment alternatives, each is described within the context of how it might meet the need. An important factor in that need is that shippers are requesting a lower cost alternative than barging and trucking. Another is that the demand to which the applicant is responding is not just a growth in demand, it is a growth in demand from central and eastern Washington. The existing pipeline was built to serve western Washington, including anticipated future western Washington demand. That was more than 30 years ago and the situation is now beyond the period of supply and demand predictions made then. This growth has triggered a need for more eastbound barges and tanker trucks that did not exist before. This creates a need for a transport system that handles projected demand from, and delivery to, central and eastern Washington, as well as western Washington. Shippers have requested that such a system be provided at lower cost. The existing systems are meeting all supply needs. The proposal, and alternatives to it, must meet cost-effective, efficient, environmental, and long-range needs.

Each north-south alternative is described with consideration for meeting those needs. There are four north-south alternatives considered, in addition to increased throughput of the existing line. Two involve replacing the existing line; two involve a second, parallel line:

(1) Increased throughput of existing line
(2) New replacement line in the same ROW
(3) New replacement line outside of ROW
(4) Parallel line serving eastern Washington alone
(5) Parallel line connected to existing line

There are differences among these alternatives in terms of cost, efficiency, environmental soundness and feasibility. All suffer from two major problems compared to the proposal: cost/feasibility and efficiency. These five alternatives are discussed in detail below. Transportation costs for alternatives are provided in Table 2-14.

(1) Increased Throughput of Existing Line. The existing line carries 174,500 bbls of product to points between Renton and Portland. This volume was achieved in 1995 when additional pumping capacity and polymers (drag reducers) were added to attempt to keep up with demand. The existing demand over and above this capacity is 44,500 bbls at existing tariffs (OPL 1998). (This could go down with higher shipping costs and vice versa.) With pump upgrades and more polymers at a cost of $6 million, the flow could be increased by 3,000 bbls per day to 177,500 bbls. This cost for this improvement is far from cost-effective and does not meet the need of 44,500 bbls, so it is impracticable from a cost and logistics standpoint.

For this reason, upgrade and future improvements to the existing line are not practical and this alternative is not further evaluated in the EIS.

Table 2-14. Transportation Costs of Alternatives (in dollars per barrel)

Cost Elements	Existing System	Isolated Independent Line	Connected ALooped@ System	Ocean Barge Alternative	Cross Cascade Pipeline
Pipeline Transportation	0.45	2.85	0.83	0	1.25
Ocean Barge Transportation	0	0	0	1.04	0
Terminal at Portland	0.25	0.25	0.25	0.25	0
River Barge Transportation	1.17	1.17	1.17	1.17	0
Terminal at Pasco	0.27	0.27	0.27	0.27	0.27
Total	2.14	4.54	2.52	2.73	1.52
Incremental Over Existing	0	2.40	0.38	0.59	(0.62)

* OPL has provided costs of $0.25 and $0.27 for terminal charges at Pasco.

Source: Lynch pers. comm.

(2) New Replacement Line in the Same ROW. A replacement line would be a 40.6 to 50.8 cm (16- to 20-inch) line with much greater capacity than the existing line. This line would carry all the product needed by western Washington customers and eastern (Pasco area) customers but would not deliver to central Washington, leaving the truck traffic across Snoqualmie Pass to continue and to grow in the future.

Replacing the line in the same ROW would require shutting down the existing line frequently during construction because it would use the same trench or be so close that it would be too dangerous to operate. In most cases, construction could not occur during operation, so the more often the shutdowns, the faster the construction, and vice versa. OPL has estimated that the project could be built in 19 months if the pipeline were shut down 80 percent of the time, and completed in 76 months if shut down only 20 percent of the time. Complete shutdown could build the project in 12 months. Revenue loss to OPL for any shutdown scenario is $27 million. Because shippers would revert to higher costs of transport during shutdown, they would incur up to $51 million in additional shipping costs via barge, trucks, rail, or ocean tankers, compared to pipeline costs. Some product terminals, which are designed for pipeline use and cannot receive marine traffic, would have to close down whenever the pipeline was shut down during construction. Eight terminals currently do not have capacity for the larger line and would have to pay to expand their facilities and pass on those costs. All shut down-related costs would occur over a 1- to 6-year period, depending upon which construction scenario is chosen.

This construction scenario would also require temporary pump stations which would be replaced for the new permanent line as they are too small for permanent operation. It would also include the risks of working next to a continually operating petroleum filled pipeline.

The existing ROW, which appears as a likely location for a new line, only exists as a legal ROW and easement for the old line and is not an existing ROW for a new line. OPL would have to negotiate new agreements with property owners to use it. Also, there is considerable development along the existing ROW which increases costs of construction. Approximately 20.9 km (13 miles) of ROW is less than 3 m (10 feet) in width and would preclude placing a second pipeline within the existing ROW even if property owner agreements could be obtained. The pipeline would require new ROW in these areas.

In terms of meeting the criteria under Purpose and Need, this alternative is not cost-effective because it would cost shippers more than they are paying now so they wouldn=t use it. In addition, it would cost OPL an additional $27 million in revenues while shut down, increasing the project cost by more than 20 percent, cost shippers an additional $50 million in transportation costs during construction, and is not as efficient as the proposal because it still requires the use of barges and trucks with their attendant risks, accidents, and possibilities of fatalities.

From an environmental perspective, a new north-south line would cross 150 roads and highways, 55 waterways wider than 30.1 m (100 feet), 8.9 ha (22 acres) of wetlands (unless avoided by leaving the ROW), hazard areas and contaminated areas, all of which increase costs or would require rerouting which increases costs.

The logistics issues associated with construction, costs to OPL of shutdown for a 1- to 7-year period, additional costs to terminals, lack of elimination of the logistics problem with trucks over Snoqualmie Pass, and most importantly, the fact that shippers would not use it due to increased cost prevent this alternative from meeting the need or being further considered.

(3) New Replacement Line Outside of ROW. This is a large-diameter single line replacement to Portland. One of the major potential benefits of a north-south option is using the existing ROW to avoid new ROW impacts. However, all of those benefits are lost with this alternative. This alternative could be built with potential impacts to roads, rivers, public uses and other impacts, but it appears that the more important factor in evaluating this alternative is its ability to meet Purpose and Need.

It is not cost-effective because it would not result in the same or lower costs to shippers. Shippers in central Washington would continue to use trucks because this alternative would not improve their situation by providing more direct access to product. Shippers in western Washington would pay more because they would get their product from a new expensive line that they must pay for instead of the existing line. For reasons of efficiency, cost-effectiveness and logistics, this alternative does not meet the Purpose and Need.

(4) Parallel Line Serving Eastern Washington Alone. To avoid affecting westside customer costs, this line (built at a cost similar to either replacement line discussed above) would only carry eastern Washington volumes. Shippers could use it, or use the other line in conjunction with barge and truck. All shippers always have their choice.

This line would require a new pump station, a new pipeline, truck loading facilities in Seattle, and barge loading facility in Portland or Vancouver, at a cost estimated by OPL to be $125 million to carry 50,000 bbls per day. This parallel line would still load onto Columbia River barges. The cost is more than the proposal because of the new support facilities and because of the considerable additional high-density developed area crossed by the pipeline compared to the proposal. The 50,000 bbls per day would come from the 23,500 bbls per day now coming up the Columbia River (out of the existing line) and 26,500 bbls per day in anticipated new volumes (volumes assumed to be desired based on commitments made through the proposal). It would have a tariff of $1.51 per barrel if it operated at those volumes. However, because shippers in eastern Washington can receive 23,500 bbls per day from the existing line for $0.45 per barrel (barge costs are the same for both options), they would only consider using the new parallel line for the product volumes in excess of that capacity. This would change the throughput of the new line from 50,000 bbls to 26,500 bbls at the same construction cost. Tariffs on a line with only 26,500 bbls passing through it would be $2.85 per barrel. At this price, it would be cheaper for eastern Washington shippers to order ocean barges directly from the refineries and increase barge traffic than to use the line. Total costs at Pasco for this alternative would be $4.54 per barrel or $2.40 more than the existing system (Table 2-14).

This alternative is not direct (efficient) and also does not serve central Washington. It would not be used by shippers and does not respond to the need. Because this does not meet the cost-effective criteria and it would not be used if built, this alternative is not practicable and is not brought forward.

(5) Parallel Line Connected to Existing Line. Another option is to build a second line and interconnect it with the existing line so that they may operate as one larger line. Aside from the environmental impacts of constructing such a line, which would be the same as the other north-south lines, OPL has calculated that costs to shippers from such a system are greater than the existing system. OPL has estimated that the cost of such a line would require a tariff of $0.83 per barrel to get it to Portland (Table 2-14). This compares to $0.45 per barrel now, an 84 percent increase. OPL feels that some shippers with options would seek other sources, lowering OPL revenues. The 84 percent cost increase amounts to $21 million in western Washington, and OPL feels that they would not prevail in a rate case at this level, by providing essentially the same service at such an increased cost.

Eastern Washington shippers may incur an 18 percent increase in costs from this option compared to today=s costs. They would not likely dispute that number at OPL rate hearings, except that the increased cost would not improve reliability because barges would still be required as part of the system. In either case, trucks would still deliver products across Snoqualmie Pass to supply central Washington at costs paid today.

Under this alternative, shippers would pay more for product they are getting now instead of less, impacts of building a new north-south line would still be felt, and barging of product would continue up the Columbia River. From a logistics standpoint, cost-effective standpoint, and efficiency standpoint, these two secondary line alternatives do not meet the Purpose and Need.

Summary of North-South Alternatives. All of the north-south alternatives would increase delivery costs to eastern Washington and, as a result, are not practicable. It is possible that the Columbia or Snake Rivers may be drawn down for significant periods of time to enhance salmon passage, especially as new endangered species listings occur. This is a hypothetical situation at this time, but it is possible, and does not add to the north-south line=s ability to meet the long-range needs for getting product to eastern Washington.

The north-south lines, with required barging and trucking components, would not meet the long-range needs of transport to eastern Washington as well as the proposal. In fact, each year that demands grow in eastern Washington, there will be more demand for barging and more demand for trucking over Snoqualmie Pass when closer to the delivery point than Pasco. The longer the window of operation of the north-south system, the less responsive this alternative is to meeting that need. A more responsive alternative would be one which provides product to all customers, without prorating, without other modes of transport, without handling, and without greater and greater use of other mechanisms of handling and transport over the long term. This can be met by a single west-to-east system of transport such as the proposal.

For the reasons discussed at the beginning of this section, the second north-south line has been eliminated from further consideration because its tariff costs to customers would eliminate its usefulness.

The north-south replacement line is likely to reduce existing pipeline spill risk by eliminating the other, older line, but brings with it minor increased risk due to barge operations and moderate increased risk due to trucking. It does not meet the long-term needs of shippers to eastern and western Washington as well as the proposal and, in fact, has several deficiencies in that regard: it requires multiple modes and more over time, it is less reliable, it is at risk from major operational changes to the river, and is not as responsive to needs in eastern Washington. It costs more than No Action to shippers and therefore, is not cost-effective. It does not meet central Washington needs. For these reasons, the north-south line alternatives are excluded from further analysis in this EIS and are not brought forward for further detailed study.

2.6.1.4 Other Means of Transport

Options such as all trucking, all barging, and other combinations all cost more than No Action and are not cost-effective or feasible. They are currently available to shippers.

2.6.2 Project Corridor Alternatives

The costs of constructing and operating a pipeline are largely dependent upon its length and change in elevation. Increasing the length of a pipeline directly increases the amount of materials and labor required, and may require adding more pump stations or increasing the diameter of the pipe to compensate for the additional frictional losses. Each of these items adds to the pipeline's construction cost. If the size of the pipe is not enlarged, the increased length would also result in consumption of larger amounts of electric energy during operation to compensate for the additional frictional losses. The estimated cost effects of these elements are approximately:

- $460,000 per mile of pipeline on generally level ground;
- $2 million for each pump station;
- $32,000 per mile to enlarge a pipeline by one standard diameter (the next larger size); and
- $36,000 per mile-year to increase the length of a pipeline while holding the diameter constant.

The cost of construction and operation also depends on the elevation profile of a pipeline route. Increasing the total elevation gain of a route or increasing the number of elevation gains and losses results in a longer route, a need for more pump stations, and increased construction costs. High points and sudden elevation losses near the end of the pipeline segments create the need to maintain higher than normal back pressures, resulting in consumption of larger amounts of electric energy and higher operating costs.

Elevation changes, length, and routing also affect the constructability of the pipeline, access to it, cost and time associated with obtaining ROW, and the environmental impacts.

Based upon the above costs and factors, OPL used the following six criteria to screen and evaluate potential alternatives for pipeline routing:

- length of the pipeline (a cost and efficiency issue);
- elevation profile and its effects on the number of pump stations required (a cost and efficiency issue);
- constructability (an efficiency issue);
- pipeline access (a cost issue);
- environmental impacts; and
- ownership/land use (an impact issue).

More details about the evaluation of route alternatives are provided in Appendix E and are summarized in Table 2-15. The following briefly describes the two Snoqualmie Pass Routes, Yakima Valley Route, Stampede Pass Route, and two Stevens Pass Routes that were considered.

2.6.2.1 Snoqualmie Pass Routes

Two alternatives to the proposed pipeline for routing through Snoqualmie Pass were considered. The Centennial Trail Alternative would begin at Thrashers Corner; follow a BPA corridor; cross the Snoqualmie River; then use a railroad ROW that generally parallels State Route 23, crossing Snoqualmie Pass and the Columbia River, to a point just east of Royal City; and then turn south to follow the same route as the proposed project. This route would be 24.1 km (15 miles) longer, have the same number of pump stations, be more difficult to construct because of the narrow

Table 2-15. Alternative Pipeline Route Evaluation Summary

Route	Pipeline Length (miles) and Cost (millions)	# of Pump Stations	Constructability	Pipeline Access	Environmental Impacts	Ownership/Land Use
Allen Station via Stevens Pass to Pasco	285 $133.0	8	less constructable than Snoqualmie Pass routes	difficult	4 river crossings: Columbia, Snohomish, Skykomish (6 times), Wenatchee	7 cities: Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere, Wenatchee
Snohomish via Stevens Pass to Pasco	240 $125.0	7	less constructable than Snoqualmie Pass routes	difficult	4 river crossings: Columbia, Snohomish, Skykomish (6 times), Wenatchee	7 cities: Monroe, Sultan, Gold Bar, Index, Leavenworth, Cashmere, Wenatchee
Thrashers Corner via Snoqualmie Pass to Pasco	230 $105.1	6	more constructable than Stevens Pass routes	easy	4 river crossings: Snoqualmie (4 times), Tolt, Columbia, Yakima	3 cities: North Bend, Snoqualmie, Kittitas (North Bend and Snoqualmie on trail)
Thrashers Corner via abandoned railroad route (Centennial Trail) and Snoqualmie Pass to Pasco	245 $115.0	6	more constructable than Stevens Pass routes	moderate	4 river crossings: Snoqualmie (4 times), Tolt, Columbia, Yakima; Significant wetland impacts along Centennial Trail	7 cities: Duvall, Carnation, North Bend, Snoqualmie, Kittitas, Ellensburg, Beverly
Hollywood via the Tolt Pipeline Corridor and Snoqualmie Pass to Pasco	225 $109.0	8	more constructable than Stevens Pass routes	easy	4 river crossings: Snoqualmie, Tolt, Columbia, Yakima	3 cities: North Bend, Snoqualmie, Kittitas. Conflict with City of Seattle Tolt River Pipeline corridor
Renton Station via Stampede Pass to Pasco	210	8	less constructable than Snoqualmie Pass routes	moderate	4 river crossings: Cedar, Green, Columbia, Yakima	Densely populated south King County. Conflict with Seattle Cedar River and Tacoma Green River watersheds
Yakima Valley	240 $110.0	8	constructable assuming paired with Snoqualmie Pass route	easy	4 river crossings: Snoqualmie (4 times), Tolt, Columbia, Yakima (6 times). Construction impacts to vineyards, orchards, crops	4 cities: Ellensburg, Yakima, Selah, Richland. Land use conflicts due to construction impacts to vineyards, orchards, crops

ROW in the Snoqualmie Valley, be less accessible because of its greater distance from I-90, have more environmental impacts based upon the same number of major river crossings but also have significant wetlands impacts along the trail, traverse four more cities and the associated populations, and cost $10 million more than the proposed project.

The Hollywood Alternative would originate near Hollywood in the Sammamish River valley, follow the City of Seattle=s Tolt River Pipeline eastward, cross the Snoqualmie River south of Duvall, connect with the BPA corridor north of Stillwater, and then follow the same route as the proposed project. This route would be 8.0 km (5 miles) shorter, require two more pump stations, be as easy to construct, be as accessible, have similar environmental impacts based upon the same number of major river crossings, and traverse the same number of cities as the proposed project. It uses a corridor that the City of Seattle owns and where a second water line is planned, eliminating space for a petroleum pipeline which eliminates this alternative as an option. It would cost $4 million more than the proposed project.

2.6.2.2 Yakima Valley Route

This route could be used with any of the Stevens, Snoqualmie, or Stampede Pass crossing alternatives, as a variation on that portion of the overall routes. As a variation on the proposed project, west of Ellensburg the route would turn south, go through the Yakima Valley following the Yakima River and crossing it a minimum of six times north of the City of Yakima, then turn southeasterly and south following a BPA ROW. At 9.7 km (6 miles) north of Grandview it would turn east and southeast, cross the Columbia River on the Interstate 182 bridge, traverse north of Pasco, and then turn south to the Northwest Terminalling Facility. This route would be 16.1 km (10 miles) longer, require two more pump stations, be more difficult to construct because of the number of crossings of the Yakima River and irrigation canals, be as accessible, have greater environmental impacts with four more major river crossings and crossing a number of vineyards and orchards, and would traverse four cities in addition to others already crossed by the proposed project. This route alternative would cost more than the proposed project and increase the costs of any alternative it would become a part of because of the additional length of the pipeline; about $5 million more for the additional river crossings ($1 million for each crossing); mitigation costs for passing through vineyards, orchards, and crops (i.e., asparagus) that cannot recover production in 1 year; revegetation costs for the additional grazing lands crossed; and the costs of purchasing the additional ROW easements.

2.6.2.3 Stampede Pass Route

This route would originate at the existing OPL Renton Station (near Interstate 405 and State Route 167), go northeasterly to State Route 169, parallel State Route 169 along powerline and railroad ROWs, turn east crossing State Route 18 just north of Hobart, then follow a BPA ROW southeasterly past Howard Hanson Reservoir and through Stampede Pass, turn southeast to connect with the John Wayne Trail, and then follow the same route as the proposed project. This route would be 32.2 km (20 miles) shorter, require two more pump stations, be more difficult to construct because of more rugged terrain (i.e, steep slopes and rock outcroppings) and higher elevations, be less accessible because of its remoteness in mountainous areas, and have more environmental impacts with the same number of major river crossings. It would also cross the strictly prohibited City of Seattle Cedar River and City of Tacoma Green River watersheds, and would traverse more densely populated areas in south King County.

2.6.2.4 Stevens Pass Routes

Two potential routes were evaluated for crossing Stevens Pass: the Allen Station Alternative and the Snohomish Alternative. The Allen Station Alternative would begin at the Allen Pump Station about 4.0 km (2.5 miles) south of Burlington; follow the existing OPL ROW until 6.4 km (4 miles) south of Everett where a new pump station would be constructed; turn east and parallel a BNRR ROW through Monroe, Sultan, and Gold Bar; enter a BPA ROW near Index that then parallels U.S. Highway 2; and follow a BNRR ROW from 3.2 km (2 miles) west of the Stevens Pass summit and through the abandoned Old Cascade Tunnel under the pass. The route would then generally follow U.S. Highway 2 and BPA ROWs to Chumstick Creek, turn south and parallel the creek and a county road until reaching Leavenworth, and follow a BPA ROW southeasterly crossing the Wenatchee River east of Monitor and the Columbia River west of Moses Coulee. It would then traverse southeasterly through the Columbia Basin Irrigation Project, intersect State Route 26 east of Royal City and parallel it until 6.4 km (4 miles) west of Othello, and then turn south and follow county roads along the same route as the proposed project to Pasco. This route would be 88.5 km (55 miles) longer than the proposal, have two more pump stations, be much more difficult to construct because of more rugged terrain (i.e., steep slopes and rock outcroppings) and higher elevations, be less accessible because it would be more remote from highways and roads, have more environmental impacts because of five additional crossings of major rivers, traverse four more cities and the associated populations, affect more motorists in the relatively narrow U.S. Highway 2 corridor, and would cost $28 million more than the proposed project.

The Snohomish Alternative would tie into the existing OPL pipelines/corridor 6.4 km (4 miles) south of Everett and then follow the same route as the Allen Station Alternative. This pipeline would be 72.4 km (45 miles) shorter than the Allen Station Alternative and 16.1 km (10 miles) longer than the proposed project; have one less pump station than for the Allen Station Alternative but one more pump station than for the proposed project; would have the same constructability, access, and environmental impacts as the Allen Station Alternative; and would cost $20 million more than the proposed project.

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